Nos. 22-1932, 22-1933, 22-1934, 22-1935

United States Court of Appeals for the Federal Circuit

EOLAS TECHNOLOGIES INCORPORATED,
Plaintiff-Appellant,

v.

AMAZON.COM, INC., GOOGLE LLC, WALMART, INC.,
Defendants-Appellees.

Appeals from the United States District Court for the Northern District of California in Nos. 4:17-cv-03022-JST, 4:17-cv-01138-JST, 4:17-cv-03023-JST, Judge Jon S. Tigar.

GOOGLE LLC,
Plaintiff-Appellee,

v.

EOLAS TECHNOLOGIES INCORPORATED,
Defendant-Appellant,

REGENTS OF THE UNIVERSITY OF CALIFORNIA,
Defendant.

Appeals from the United States District Court for the Northern District of California in No. 4:15-cv-05446-JST, Judge Jon S. Tigar.

BRIEF FOR EOLAS TECHNOLOGIES INCORPORATED

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September 22, 2022

U.S. Patent No. 9,195,507 (the ’507 patent)

32. A method, performed by a server computer connected to the World Wide Web distributed hypermedia network on the Internet, for disseminating interactive content via the World Wide Web distributed hypermedia network on the Internet, the method comprising:

A. receiving, by the server computer, a request for information; and

B. transferring, by the server computer, the information onto the World Wide Web distributed hypermedia network on the Internet, wherein:

(i) a World Wide Web browser on a client computer connected to the World Wide Web distributed hypermedia network has been configured with a plurality of different interactive-content applications, each said interactive-content application being configured to enable a user to interact, within one or more World Wide Web pages, with at least part of one or more objects while at least part of each of said one or more objects is displayed to the user within at least one of said one or more World Wide Web pages, and

(ii) at least part of the information is configured to allow the World Wide Web browser on the client computer to:

a. detect at least part of an object to be displayed in a World Wide Web page, and

b. cause a display of the World Wide Web page to a user,

(iii) the World Wide Web browser has been configured to:

a. select an interactive-content application, based upon the information, from among the different interactive-content applications, and

b. automatically invoke the selected interactive-content application to enable the user to employ the selected interactive-content application to interact within the World Wide Web page with at least part of the object while at least part of the object is displayed to the user within the World Wide Web page, wherein the automatically invoked interactive-content application has been configured to operate as part of a distributed application configured to enable a user to perform the interaction through the use of communications sent to and received from at least a portion of the distributed application located on two or more distributed application computers connected to the World Wide Web distributed hypermedia network on the Internet, the two or more distributed application computers being remote from the client computer.

CERTIFICATE OF INTEREST

Case Number	Nos. 22-1932, 22-1933, 22-1934, 22-1935
Short Case Caption	Eolas Technologies Incorporated v. Amazon.com, Inc.
Filing Party/Entity	Eolas Technologies Incorporated

Instructions: Complete each section of the form. In answering items 2 and 3, be specific as to which represented entities the answers apply; lack of specificity may result in non-compliance. **Please enter only one item per box; attach additional pages as needed and check the relevant box**. Counsel must immediately file an amended Certificate of Interest if information changes. Fed. Cir. R. 47.4(b).

I certify the following information and any attached sheets are accurate and complete to the best of my knowledge.

Date September 22, 2022

Signature: /s/ *Joel L. Thollander*

Name: Joel L. Thollander

1. Represented Entities. Fed. Cir. R. 47.4(a)(1).	**2. Real Party in Interest.** Fed. Cir. R. 47.4(a)(2).	3. **Parent Corporations and Stockholders**. Fed. Cir. R. 47.4(a)(3).
Provide the full names of all entities represented by undersigned counsel in this case.	Provide the full names of all real parties in interest for the entities. Do not list the real parties if they are the same as the entities. ☒ None/Not Applicable	Provide the full names of all parent corporations for the entities and all publicly held companies that own 10% or more stock in the entities. ☒ None/Not Applicable
Eolas Technologies Incorporated	None.	None.

☐ ADDITIONAL PAGES ATTACHED

4. Legal Representatives. List all law firms, partners, and associates that (a) appeared for the entities in the originating court or agency or (b) are expected to appear in this court for the entities. Do not include those who have already entered an appearance in this court. Fed. Cir. R. 47.4(a)(4).

☐ None/Not Applicable ☐ Additional pages attached

McKool Smith Hennigan, P.C.:	Alan P. Block
McKool Smith, P.C.:	Eliza Beeney, Jennifer L. Truelove, John F. Garvish II, Kevin Hess, Mike McKool, Craig N. Tolliver (no longer with the firm), Kevin L. Burgess (no longer with the firm), Mario A. Apreotesi (no longer with the firm), Stephanie M. Ryan (no longer with the firm)
Dan Johnson Law Group, LLP	Daniel Johnson Jr., James A. Glenn, Mario Moore, Robert G. Litts (no longer with the firm)
Patton Tidwell & Culbertson	Geoffrey P. Culbertson, Kelly Tidwell
Molo Lamken LLP	Jeffrey A. Lamken, Megan C. Church

5. Related Cases. Provide the case titles and numbers of any case known to be pending in this court or any other court or agency that will directly affect or be directly affected by this court's decision in the pending appeal. Do not include the originating case number(s). Fed. Cir. R. 47.4(a)(5). See also Fed. Cir. R. 47.5(b).

☐ None/Not Applicable ☐ Additional pages attached

Eolas Technologies Incorporated v. Google LLC, No. 22-1933 (Fed. Cir.)	*Eolas Technologies Incorporated v. Walmart, Inc.*, No. 22-1934 (Fed. Cir.)	*Google LLC v. Eolas Technologies Incorporated*, No. 22-1935 (Fed. Cir.)
Eolas Technologies Incorporated v. Wal-Mart Stores Texas, LLC, No. 6:17-cv-242 (E.D. Tex.)	*In re: Google Inc.*, No. 17-107 (Fed. Cir. Feb. 23, 2017) (Prost, C.J.) (granting venue-related mandamus petition in the	*In re: Google Inc.*, No. 17-103 (Fed. Cir. Nov. 4, 2016) (order dismissing venue-related mandamus petition in the district

	district court case underlying docketed Case No. 22-1933)	court case underlying docketed Case No. 22-1933)
Eolas Technologies Incorporated et al. v. Amazon.com, Inc. et al., No. 12-1632 (Fed. Cir. July 22, 2013) (per curiam (Newman, J.; Bryson, J.; Prost, J.) Rule 36 Judgment in case involving family members of current Patent-in-Suit)	*In re Google Inc. et al.*, Misc. Docket No. 968 (Fed. Cir. Mar. 4, 2011) (Moore, J.) (denying venue-related mandamus petition in the district court case underlying docketed Case No. 12-1632)	

6. Organizational Victims and Bankruptcy Cases. Provide any information required under Fed. R. App. P. 26.1(b) (organizational victims in criminal cases) and 26.1(c) (bankruptcy case debtors and trustees). Fed. Cir. R. 47.4(a)(6).

☒ None/Not Applicable ☐ Additional pages attached

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STATEMENT OF RELATED CASES

The underlying cases gave rise to venue-related mandamus petitions and orders: *In re Google Inc.*, No. 17-107 (Fed. Cir. Feb. 23, 2017) (Prost, C.J.) (granting venue-related mandamus petition in the district court case underlying docketed appeal No. 22-1933); *In re Google Inc.*, No. 17-103 (Fed. Cir. Nov. 4, 2016) (dismissing venue-related mandamus petition in the district court case underlying docketed appeal No. 22-1933). There was also an appeal from a prior case involving family members of the current patent-in-suit: *Eolas Technologies Incorporated v. Amazon.com, Inc.*, No. 12-1632 (Fed. Cir. July 22, 2013) (Newman, J.; Bryson, J; Prost, J.) (issuing per curiam rule 36 judgment). And there remains one related case pending against another Wal-Mart entity in Texas: *Eolas Technologies Incorporated v. Wal-Mart Stores Texas, LLC*, No. 6:17-cv-242 (E.D. Tex.). Counsel for Eolas knows of no other cases pending in this Court or any other court that will directly affect or be affected by the Court's decision in these consolidated appeals.

JURISDICTIONAL STATEMENT

The district court had subject matter jurisdiction over these patent-infringement actions under 28 U.S.C. §§ 1331 and 1338. This Court has jurisdiction over these appeals under 28 U.S.C. § 1295(a)(1). The appeals are timely under FED. R. APP. P. 4(a)(1)(A) because the final judgments were entered on May 16, 2022 (Appx38), with the notices of appeal filed on June 10, 2022 (Appx21572-21573).

STATEMENT OF THE ISSUE

Whether the district court erred in finding the asserted claims patent-ineligible when those claims are directed to improving the interactivity, scalability, and security of a pre-existing computer network system, and their specific solutions for achieving those improvements in useful computer functionality were not well-understood, routine, or conventional at the time of their invention.

STATEMENT OF THE CASE

A. Preliminary Statement.

The asserted patent claims recite systems and methods designed to improve then-nascent open distributed hypermedia network systems. In dozens of lines of text, the claims recite specific configurations of servers, browsers, pages, objects, and interactive-content applications that substantially increase the useful functionality of the World Wide Web in areas of interactivity, scalability, and security. These claims—which are unmistakably intended to improve the functional usefulness of a pre-existing computer network system—are directed to patent-

eligible subject matter under 35 U.S.C. § 101. They fit comfortably within a substantial line of precedent from this Court finding similar claims patent-eligible.

Confident in the patent-eligibility of the claims, Eolas attempted to resolve the § 101 question in these cases in 2016. But Defendants blocked that attempt, and litigated these patent-infringement cases for six more years before finally raising the patent-eligibility issue in an omnibus summary judgment motion in 2022.

The district court erred in finding the asserted claims patent-ineligible and disposing of these long-litigated cases on that ground just as trial was approaching. At *Alice* step one, the district court improperly overgeneralized the claims in a way that disregarded or discounted virtually every relevant limitation and advance over the art. And even that overgeneralized characterization of the claims *still* failed to identify an abstract idea. At *Alice* step two, the district court never asked the controlling question: whether the claimed combination of limitations reflected routine and conventional activity. Earlier in the litigations, however, the district court confirmed—in a ruling the court never questioned—that the claimed combination of limitations *did not* reflect routine and conventional activity.

Because these claims are patent-eligible, reversal and remand is appropriate.

B. Eolas's Origins and the Parent Patent.

In 1993, Dr. Michael Doyle, David C. Martin, and Cheong Ang worked at the Center for Knowledge Management at University of California at San Francisco

(UCSF). Appx12196. Their task: "com[ing] up with new technologies to disseminate the results of [biomedical embryo research] activities to the outside world" for use in detecting and treating birth defects. Appx12196-12197.

To that end, the scientists sought to make 3D image reconstructions of the embryo research available over a network for interactive exploration. Appx12197-12198. But the World Wide Web at the time was in its infancy and did not permit interactivity, much less interactivity by multiple medical professionals with large, complex 3D images that a computer would struggle to store and process. Rather, "the web at the time was very primitive" and "designed for working with documents that didn't change." Appx12199-12200. Indeed, early Web designers like Marc Andreessen—the co-creator of the Netscape Web browser released in late 1994—wanted to keep the Web static and avoid interactivity with "generic inclusions," such as audio or video (MPEG). Appx12216-12217, Appx13097-13099. The preferred route was to download such files onto a local computer and work with the files using a "helper application." Appx12216-12217, Appx12239.

Undeterred, Doyle, Martin, and Ang developed a solution where "the user's PC could actually tap into powerful remote computational research, powerful remote supercomputers" and "the user could interact with that [3D image] within the documents as if they had a control panel to the supercomputer." Appx12203. The inventive solution enabled non-technical researchers to use Web browsers to access

and interact with 3D images stored and processed on multiple servers. Appx12204. This was only possible with the invention's improvements to the functionality of the nascent World Wide Web in the areas of interactivity, security, and scalability. Based on their work, the inventors filed a first patent application, assigned to the University of California Board of Regents (UC Regents), which issued as U.S. Patent No. 5,838,906 (the '906 patent). Appx12252-12285, Appx12287-12290.

In 1995, Doyle formed Eolas Technologies Incorporated (Eolas) and UC Regents granted Eolas an exclusive license to the technology. Appx12292-12333. Eolas's plan was to "creat[e] and licens[e] innovative technologies and related products which will enable the World Wide Web to become the preferred environment for all interactive computing applications by the year 2000." Appx12337. This arrangement was commonplace for UC Regents as part of its effort aimed at "creating public benefit from [discovering] new knowledge." Appx12457-12459. UC Regents encouraged inventors' entrepreneurial efforts and "allow[ed] companies to take [patents] out into the world." Appx12458. UC Regents "has been doing this … probably since the '60s" and is "one of the universities with the longest history of working in patenting and licensing technology." Appx12459.

C. The Microsoft and Adobe Lawsuits.

In 1999, Eolas sued Microsoft for infringing the '906 patent. Appx12463-12470. A jury found for Eolas. Appx12472-12479. On appeal, this Court affirmed

the judgment as to claim construction and infringement, but vacated and remanded on Microsoft's invalidity claims for consideration of excluded evidence. *Eolas Techs. Inc. v. Microsoft Corp.*, 399 F.3d 1325 (Fed. Cir. 2005). Eolas and Microsoft settled before retrial, and the case was dismissed. Appx12481-12483.

While the Microsoft lawsuit was pending, the PTO initiated two *ex parte* reexaminations of the '906 patent. The PTO confirmed the patentability of the '906 patent claims in both reexaminations. Appx12272-12285. Also during the pendency of the Microsoft lawsuit, UC Regents filed a continuation application stemming from the '906 patent disclosure. Appx12485. Examiner Larry Donaghue handled examination for the PTO. Appx12485. The PTO issued an obviousness-type double patenting (OTDP) rejection based on '906 patent claims, UC Regents responded by filing a terminal disclaimer, and the PTO issued U.S. Patent No. 7,599,985 (the '985 patent). Appx12517-12528, Appx12530, Appx12485.

In 2009, Eolas sued Adobe, Amazon, Google, and a number of other companies in the Eastern District of Texas for infringing the '906 and '985 patents. Appx12532-12552. UC Regents also joined the suit as a plaintiff. Appx12555. The district court ordered a separate, invalidity-only trial. Appx12557-12558. By trial, most of the defendants in the Adobe lawsuit had settled. Appx12560-12590.

Just days before trial was set to begin, Amazon, Google, and the other remaining defendants alleged the term "browser application" was not limited to Web

browsers, but applied to non-Web systems. Appx12592-12612. Amazon and Google contended that if the "browser application" term was limited to Web browsers, then Eolas would "avoid some of defendants' prior art," because Web-browser limited claims would not be obvious in light of that alleged prior art. Appx12225, Appx12602. The district court agreed with Amazon's and Google's proposed construction and held the "claims have not limited the browser application to operating only within the Internet or World Wide Web." Appx12171-12176.

Amazon and Google presented four theories of invalidity at trial, three of which were grounded in obviousness. Leveraging their eve-of-trial claim construction, Amazon and Google argued to the jury that certain limitations were not part of the '906 and '985 patent claims and they were not required to prove that those features were obvious. In particular, they argued to the jury that the claims were not limited to the Web. Appx12180 ("There's no requirement that the browser be a web browser."). They also argued that the '906 and '985 patent claims included no security-related limitations. Appx12188-12189 ("There's no security issues at all associated with the claims."), Appx12452 ("The Court's construction of type information says nothing about security, does it, sir?"), Appx12181. The jury found the claims invalid in a general verdict form, the district court entered judgment, and this Court affirmed. Appx12614-12615, Appx12617-12618, Appx12620-12622.

D. Google's Suit Against UC Regents and Eolas.

UC Regents filed two more continuation applications in 2006, and Examiner Donaghue again handled the examinations for the PTO. Appx12628, Appx12673. In both examinations, Examiner Donaghue issued OTDP rejections based on the '906 and '985 patent claims, and UC Regents responded with terminal disclaimers. Appx12718-12723, Appx12725-12716, Appx12728-12733, Appx12735-12736. The PTO then issued U.S. Patent Nos. 8,808,293 (the '293 patent) and 8,086,662 (the '662 patent). Appx12628, Appx12673.

In 2013, Google sued UC Regents and Eolas in the Northern District of California seeking a declaratory judgment of non-infringement on the '293 and '662 patents. Appx12738-12748. UC Regents and Eolas counterclaimed for infringement of the '293 and '662 patents, but later moved to dismiss. Appx12750-12772. The district court dismissed the infringement claims with prejudice but noted that it could not opine as to the claims of any then-pending application "because those claims have not yet even been asserted." Appx12775.

E. Prosecuting the '507 Patent.

In 2011, UC Regents filed another continuation application. Appx12785. Examiner Donaghue again handled the examination. Appx12785. UC Regents requested expedited examination based on PTO regulations for an "application [that] by relation to a prior United States application, has an effective pendency of more

than five years," and the PTO granted the request. Appx12828-12829, Appx12831-12832. Despite granting expedited examination, the application went unexamined for over three years and, by May 2014, the PTO predicted it would not issue a first office action until March 2015. Appx12834.

On January 6, 2015, the PTO finally acted: Examiner Donaghue sought "factual information regarding why [UC Regents] believes that the present claims are distinguished" over the asserted prior art from the Adobe lawsuit and how they "were different from the court case." Appx12836-12837, Appx12851. UC Regents filed a response explaining how the claims differed from both the '906 and '985 patent claims and Amazon's and Google's prior art. Appx12836-12846. UC Regents noted distinctions related to the Web, Web browsers, Web browsers configured with interactive-content applications, and a distributed application with two or more remote servers. Appx12836-12846. UC Regents also explained that the claims addressed security concerns present in the prior art. Appx12836-12846. ("Since the data structure controls the selection of the interactive-content application to be invoked by the browser, … the claimed system provides enhanced security over a malicious web author attempting to create interactive content that can breach the web browser's security by making its own selection of the interactive-content application and launching an application on the client computer to take over the

user's machine.").[1] With this information and minor claim editing, the PTO awarded the patent without an OTDP rejection. Appx12845-12864, Appx12866-12887, Appx12889-12897, Appx12899-12923, Appx12925-12928. UC Regents assigned the soon-to-be-issued patent and its family to Eolas. Appx12954-12966.

U.S. Patent No. 9,195,507 (the '507 patent) issued on November 24, 2015. Appx12783-12826. Because of the PTO's delay in acting on the application, the PTO ordered that the patent would be subject to a total patent-term adjustment of 1,042 days. Appx4208-4212, Appx15242.

F. Eolas's Suit Against Amazon, Google, and Walmart.

Following issuance, Eolas sued Amazon, Google, and Walmart for infringing the '507 patent in the Eastern District of Texas—Eolas's home and the forum for the prior litigation. Appx442-466. After receiving Defendants' responses to the complaint, Eolas asked the Texas court to set early summary judgment deadlines for Defendants' legal arguments and issues relating to the prior claims and litigations, such as § 101 and collateral estoppel. Appx2336. Defendants objected to early

[1] As UC Regents explained, this was in contrast to the "ViolaWWW approach," which "would be unsuitable for the dissemination of interactive content by a Web author to a number of end users" for critical security reasons. Appx12842. "Because the Web author would have control over the content of the script specified by the tag, … a malicious Web author could specify the execution of any program on the user's client computer, which could lead to the Web author completely taking over control of the client computer, for example, to delete or damage files or data, if he or she so wished." Appx12842.

resolution of these issues. Appx2337. Amazon later admitted that its strategy was "based on which motions the Texas court would have been receptive to." Appx9756. Because "Amazon believe[d]" the Northern District of California court might "be more receptive" to the issues, Defendants wanted to wait to file such motions until after a potential transfer to that court. Appx9756.

In May 2016, while these cases were still pending in Texas, Eolas filed an early motion of "no invalidity" under § 101. Appx3560-3579. The Texas court denied the motion without prejudice in early December 2016, in part because it had not yet engaged in claim construction. Appx6513-6514. The court issued its claim construction order shortly thereafter, construing over a dozen terms in the '507 patent. Appx6515-6551. The court rejected Defendants' indefiniteness and § 112(f) challenges related to the claimed "interactive-content application." Appx6521-6527. The Texas court also rejected Defendants' indefiniteness challenges to other terms, including "distributed application." Appx6527-6531.

Also in early December 2016, Google filed a petition for writ of mandamus, challenging the Texas court's denial of Google's motion to transfer venue to the Northern District of California. On February 23, 2017, this Court held that the Texas court should have ordered a transfer, and granted Google's petition. Appx6664-6670. Judge Linn dissented, noting that Google's petition for writ of mandamus in the Adobe litigation had been denied several years earlier. Appx6671.

Pursuant to this Court's order, the Texas court transferred the Google case to the Northern District of California. Appx6676-6677. Amazon and Walmart then renewed their own requests to transfer venue. Appx6705-6741, Appx6743-6762. Amazon sought a transfer to the Western District of Washington, or alternatively to California. Appx9716-9717. Walmart requested reconsideration of its motion for transfer to California. Appx9713-9714. The Texas court granted both motions and transferred the Amazon and Walmart cases to the Northern District of California.

By the time Defendants secured transfer in April 2017, these cases were in their later stages. Claim construction was complete. Appx6515-6551. Fact discovery was closed. Appx6660. Eolas, Amazon, and Walmart had served expert reports. Appx6701, Appx9432. Still, Defendants did not file any § 101 motion—they chose instead to spend nearly three years seeking an unwarranted disposition of these cases based on an alleged prosecution bar issue (which the California court ultimately rejected) that would not require the court to reach the merits of the cases. Appx10094-10100, Appx10130. With that years-long diversion concluded and little remaining other than summary judgment briefing and trial, Defendants moved, in March 2020, for resolution of their estoppel defenses, including OTDP (Appx10307-10345), as well as for reconsideration of the construction of the "interactive-content application" claim term (Appx11495-11499). Defendants still refused to move on their § 101 defense in March 2020, as they "prefer[red] not to at [that] time."

Appx10131. The motions were denied, confirming among other things the Texas court's holdings that the "interactive-content application" term is not indefinite and not subject to § 112(f). Appx13531-13539, Appx13633-13649.

For the OTDP defense, Defendants asserted that the '507 patent claims were directed to the same inventions as the claims in Eolas's predecessor patents or were, otherwise, obvious modifications of the predecessor claims. Appx10323-10325. Defendants argued that the '507 patent claims recited a "routine incorporation of Internet technology into existing processes." Appx13343-13344. The district court rejected that argument. It found, among other things, "no evidence" that "it was 'routine' or 'commonplace' to adapt" a prior "method of serving digital information in … a distributed hypermedia network environment," to a "World Wide Web browser … configured to: (a) select an interactive-content application, … and (b) automatically invoke the selected interactive-content application to enable the user to employ the selected interactive-content application to interact within the World Wide Web page." Appx13643. The court found that Defendants "merely allude[d] to prior art which involved 'the use of distributed computing networks' and 'computers [which] worked together to solve a computational problem.'" Appx13644. But "[t]hese prior art references d[id] not appear to involve the World Wide Web and provide[d] no indication that a person of ordinary skill in the art

would have been 'motivat[ed] to narrow the [previously patented] genus' to the 'World Wide Web' species contained in the '507 patent." Appx13644.

G. Defendants Finally Move for Summary Judgment on § 101.

In February 2022, after more than six years of litigation, and as trial approached, Defendants finally filed the § 101 motion Eolas had asked them to file in 2016. Appx2336, Appx15324, Appx15329-15343. Defendants contended that the asserted claims are patent-ineligible at *Alice* step one because they are directed to the abstract idea of dividing or distributing, across a set of computers, the work required to provide interactive applications on the Web. Appx15329-15339. Defendants also contended that the claims are ineligible at *Alice* step two because they recite generic computing components executing generic computing functions and therefore do not provide any inventive concept. Appx15339-15343.

In response, Eolas pointed out that the '507 patent claims are not directed to an abstract idea. Rather, they provide improvements to computer network technology and address systemic problems that plagued the World Wide Web in the early 1990s, including issues of interactivity, security, and scalability. So the asserted claims are valid at *Alice* step one. And Eolas explained that the claims would also be patent-eligible at *Alice* step two because they recite an inventive concept—providing unconventional technical solutions to technical problems. The configuration of a Web browser to automatically invoke a distributed interactive-

content application and employ it to interact within a Web page was not routine or commonplace in the early 1990s—it was a specific and substantial improvement to an existing computer network technology. Appx19666-19667, Appx19689-19691.

The California court nevertheless granted Defendants' motion for summary judgment without a hearing, finding that the asserted claims of the '507 patent were invalid under § 101 at both step one and step two of the *Alice* framework.

At *Alice* step one, the court concluded that the claims were not directed to improving a computer technology. Rather, the court found them "directed to the abstract idea of enabling interactivity with remote objects on a client computer browser using distributed computing" and therefore, according to the district court, patent-ineligible. Appx10. The court also found the claims ineligible at *Alice* step two. In doing so, the court essentially collapsed the *Alice* step two analysis into the analysis for step one. The court found that claim limitations Eolas identified as supplying the inventive concept "embody the abstract idea to which the asserted claims are directed, which is enabling interactivity with remote objects in client computer browsers using distributed computing." Appx32. The court noted that these were the same limitations it "analyzed in detail at step one and found to be directed to an abstract idea, and not a specific technological solution." Appx32.

After Defendants' summary judgment motion was granted, judgment was entered, and this appeal followed. Appx38, Appx21572-21573.

H. The Invention Claimed in the ’507 patent.

To understand the significance of the invention claimed in the ’507 patent, it helps to take a step back and remember what the Web looked like in October 1994—the priority date for the ’507 patent. The Web was in its infancy then; there was no Amazon, no Google, no online Walmart shopping. Appx17453-17454. The Web was a place of static text, blue-underlined hyperlinks, and the occasional static image, most likely accessed with a dial-up modem. Appx17453-17454. The early 1990s Web was markedly different from the highly-interactive Web we take for granted today. This is captured in the screenshot of Microsoft’s first 1994-era website. Appx11971.

Web designers like Marc Andreessen (co-creator of early Web browsers Mosaic and Netscape (Appx20104)) believed the Web should be static and devoid of interactivity. As Mr. Andreessen explained, static images were as far as the Web should go—the Web should not have “generic inclusions” such as audio or video:

> Inlined images located on other servers are bad enough—if we start making generic inclusions available, things are going to get hairy. IMHO. Plus, this is hypertext—most times, generic inclusions shouldn't be per se necessary, or even necessarily useful compared to a hyperlink.

Appx19967-19968 (emphases added). Indeed, the limited resources of networks and computers in the early 1990s made displaying even static images in Web pages difficult. The preferred route at the time was to use "helper applications"—standalone applications outside of Web browsers. Appx17455. But even then, Mr. Andreessen cautioned that Web browsers should not be launching other programs: "I still don't like the idea of firing off arbitrary executables on the client side." Appx19971, Appx53 (citing http://ksi.cpsc.ucalgary.ca/archives/WWW-TALK/www-talk-1993q2.messages/573.html). Allowing Web pages to invoke "arbitrary executables" on a user's computer posed a security threat. Appx12842.

This presented the inventors with another problem: how to unleash interactivity on the Web when Web designers were insisting that traveling even small steps down that road was a bad idea. Undeterred, the inventors enabled interaction over the Web with large 3D datasets using coordinated, distributed servers they designed and a Web browser they modified to provide security. Appx12023, Appx11972. They documented their invention in a lab notebook by September 1993, had a working embodiment by November 1993, and presented the invention in January 1994. Appx12210-12215, Appx12239-12240, Appx12975-12978, Appx13030-13096. Once the inventors disclosed their invention, the same critics "expressed admiration for the inventors of the patent, implicitly recognizing that the invention satisfied need they had previously failed to appreciate."

Appx12218. In 1996—years *after* the inventors had done so, the Web adopted a mechanism to embed interactive objects in Web pages. Appx12024, Appx11972.

The ’507 patent relates generally to systems and methods for manipulating data in a computer network; for enabling interactivity with embedded program objects in the World Wide Web as implemented on the open distributed hypermedia system of the Internet. Appx67 (1:23–26), Appx69 (5:21-35). The invention of the ’507 patent overcame many problems that existed in October 1994 with open distributed hypermedia systems, and the World Wide Web in particular.

1. Improved Web interactivity. When attempting to retrieve and present large data objects (*e.g.*, still or motion images or other media), Web browsers and viewers used on small, relatively cheap computers were “not capable of performing the computation necessary to generate and render new views of these large data objects in real time.” Appx69 (5:50-52). The ’507 patent solved this problem, in part, with the use of distributed applications across multiple server computers remote from client computers Appx70 (7:1-3), Appx17453-17456. This distribution of applications can be seen in exemplary Figures 6 and 10.

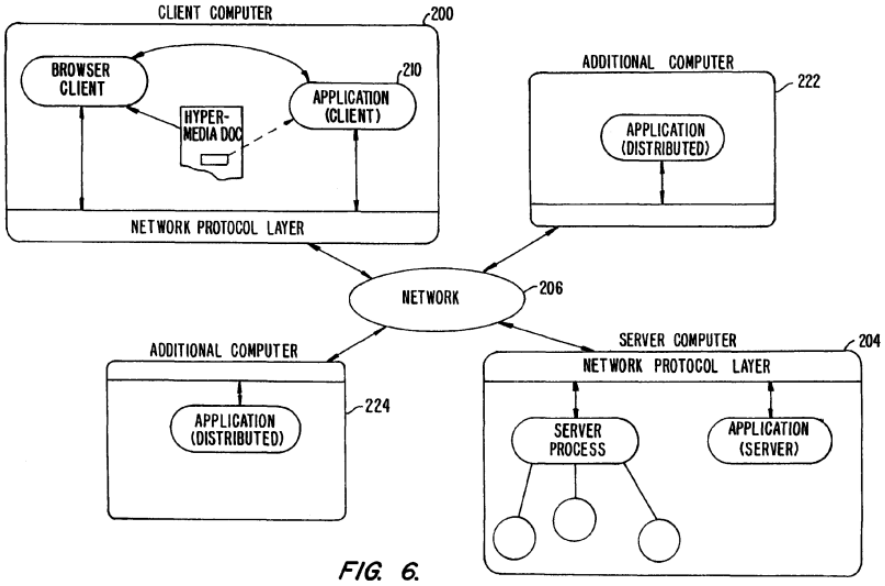

FIG. 6.

Appx62.

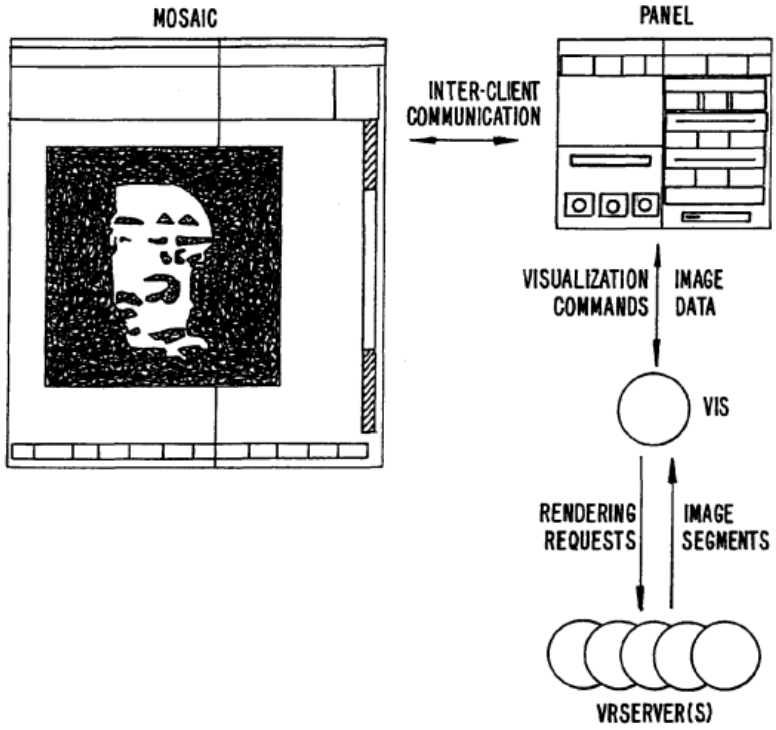

FIG. 10.

Appx66.

With the inventions, helper applications are not needed as they were before. Appx17453. Instead, a new kind of application is broken up and distributed on computers remote from the client, with one portion working in the browser itself. This allows a portion of a larger object to be embedded directly into a Web page (as in Figure 10), such that users can interact with at least a portion of an object as it is displayed in the Web browser also using the Web browser's controls. Appx17453. This was a marked improvement and a significant reconfiguration of the structure of the Web prior to the invention—where users would download objects and interact with those objects on their local computer through a helper application.

2. Improved Web security. In 1994, security threats posed another problem for open distributed hypermedia systems such as the World Wide Web. A browser known as the ViolaWWW browser, for example, would run whatever application was requested with no questions asked, and the user's browser could lose control—the concern Mr. Andreessen expressed about "arbitrary executables." Appx12971-12972, Appx19981-19982, Appx53 (citing document at Appx12971).

The asserted claims of the '507 patent improved security by ensuring that only interactive-content applications with which a Web browser has been configured can be used. Appx12027-12029. As the inventors explained to the PTO in securing the claims of the '507 patent, this "provides enhanced security over a malicious web author attempting to create interactive content that can breach the web browser's

security by making its own selection of the interactive-content application and launching an application on the client computer to take over the user's machine." Appx12842. Another advantage of this feature is that it permits Web authors of interactive content to "write-once-publish-many." Appx12977. That is, a Web author need only write one piece of Web code and Web browsers are configured with a safe interactive-content application to present the interactive content to the user. Appx12977. Web authors need not account for the millions—or billions—of different user computer configurations. Appx12977.

3. Improved Web scalability. Resource management and scalability posed additional problems to the nascent World Wide Web in 1994, especially where end users had resource-limited computers. Appx12032-12035. In some embodiments of the invention of the '507 patent, this problem was solved by requiring that one of the distributed application computers "coordinate" the performance of a task, *e.g.*, the interactive-content application communicates with a coordination server that in turn communicates with further servers to compute server-chosen portions of the interactive object. Appx12032-12033. Again, this distribution and coordination can be seen in Figures 6 and 10. Appx62, Appx66; *supra* at 18.

The above-described features, and others, of the '507 patent inventions are contained in the asserted claims of the '507 patent. For example, asserted claim 32, which spans 44 lines (Appx78 (23:25-24:2)), includes detailed aspects of how

distributed interactive-content applications are provided on the Web. Claim 32 requires steps for a server receiving requests for, and transmitting information over, the World Wide Web, wherein the transmitted information enables a Web browser to: (1) select, based upon the transmitted information, an interactive-content application from among a plurality of different interactive-content applications; and (2) automatically invoke the selected interactive-content application to enable the user to employ the selected interactive-content application to interact within a Web page, wherein the automatically invoked interactive-content application has been configured to operate as part of a distributed application located on two or more remote distributed application computers connected to the Web. It recites:

> 32. A method, performed by a server computer connected to the World Wide Web distributed hypermedia network on the Internet, for disseminating interactive content via the World Wide Web distributed hypermedia network on the Internet, the method comprising:
>
> A. receiving, by the server computer, a request for information; and
>
> B. transferring, by the server computer, the information onto the World Wide Web distributed hypermedia network on the Internet, wherein:
>
> (i) a World Wide Web browser on a client computer connected to the World Wide Web distributed hypermedia network has been configured with a plurality of different interactive-content applications, each said interactive-content application being configured to enable a user to interact, within one or more World Wide Web pages, with at least part of one or more objects while at least part of each of said one or more objects is displayed to the user within at least one of said one or more World Wide Web pages, and
>
> (ii) at least part of the information is configured to allow the World Wide Web browser on the client computer to:
>
> a. detect at least part of an object to be displayed in a World Wide Web page, and

b. cause a display of the World Wide Web page to a user,

(iii) the World Wide Web browser has been configured to:

a. select an interactive-content application, based upon the information, from among the different interactive-content applications, and

b. automatically invoke the selected interactive-content application to enable the user to employ the selected interactive-content application to interact within the World Wide Web page with at least part of the object while at least part of the object is displayed to the user within the World Wide Web page, wherein the automatically invoked interactive-content application has been configured to operate as part of a distributed application configured to enable a user to perform the interaction through the use of communications sent to and received from at least a portion of the distributed application located on two or more distributed application computers connected to the World Wide Web distributed hypermedia network on the Internet, the two or more distributed application computers being remote from the client computer.

Appx78 (23:25-24:2). Asserted claims 37 and 39 depend from claim 32, and those claims add limitations requiring one or more coordination computers that coordinate at least part of the distributed application to perform at least one task. Appx78 (24:24-26, 24:30-32). Asserted independent claim 19 and its dependent claims 24 and 26 are system claims having similar limitations to claims 32, 37, and 39. Appx77 (21:58-22:38, 22:61-64), Appx78 (23:1-3). Claim 45 recites a method performed by one or more computers for coordinating distributed processing to enable dissemination of interactive content to a client computer. Appx78-79 (24:56-25:37). Like claim 32, claim 45 operates in an environment that requires a World Wide Web browser, enabled by the information transferred onto the World Wide Web distributed hypermedia network, to be able to select and automatically invoke an

interactive-content application from among different interactive-content applications. Appx79 (25:12-37). Unlike claim 32, claim 45 also (i) requires that the one or more computers coordinate processing and communications so that such computers work together to perform tasks, and (ii) adds limitations requiring "viewing transformations" done by remote computers. Appx78-79 (24:60-25:11).

SUMMARY OF THE ARGUMENT

The asserted '507 patent claims are patent-eligible under 35 U.S.C. § 101.

1. The asserted claims are patent-eligible under *Alice* step one. These claims are directed to an improved computer network: a World Wide Web in which the major components of that hypermedia network have been reconfigured in specific ways to overcome particular problems and enable substantially improved functionality in the areas of interactivity, scalability, and security.

The inventors identified a number of problems facing the then-nascent Web. Interactivity was severely limited: "while the present open distributed hypermedia system on the Internet allows users to locate and retrieve data objects it allows users very little, if any interaction with these data objects." Appx69. At that time, users would interact with objects by downloading them onto their client computers and then launching external applications that would permit manipulation. There were also critical limitations imposed by the processing power of end users' computers: "Due to the relatively low bandwidth of the Internet (as compared to today's large

data objects) and the relatively small amount of processing power available at client computers, many valuable tasks performed by computers cannot be performed by users at client computers on the Internet." Appx69. And there were security vulnerabilities in play at the time: "a malicious Web author could specify the execution of any program on the user's client computer, which could lead to the Web author completely taking over control of the client computer." Appx12842.

In the lengthy and detailed claims of the '507 patent—claim 32 takes up 44 lines of text—the inventors recited a specific configuration of servers, browsers, pages, objects, and interactive-content applications that, when put together, overcame these problems and substantially improved the useful functionality of the World Wide Web. Now, rather than downloading objects to be manipulated with outside-the-Web-browser helper applications, objects are embedded within Web pages and Web browsers are configured with applications that can be automatically invoked to permit manipulation while the object is displayed within the Web page. This was a substantial advance in Web interactivity: one adopted later, after the inventors disclosed their new approach. In addition to relocating applications, the claims also reconfigured them: the new applications are broken up and distributed, with one part working in the browser and other parts on remote distributed application computers. Their distributed tasks can be coordinated by coordination computers. This was an important advance in Web scalability. The security problem

was also addressed: in the improved Web of the '507 patent, only interactive-content applications with which a Web browser has been configured can be utilized.

A long line of this Court's § 101 precedents confirm that these specific technological solutions to the specific technological problems identified by the inventors are patent-eligible under *Alice* step one. *Infra* at 35-42.

The district court's analysis, which is reviewed *de novo*, suffers from a number of missteps. The court found that "the asserted claims are directed to the abstract idea of enabling interactivity with remote objects on a client computer browser using distributed computing." Appx10. This characterization is overgeneralized and untethered from the language of the claims. It completely ignores the World Wide Web—a phrase that claim 32 recites *fourteen* times. It completely ignores the requirements for the specific configuration of servers, browsers, pages, objects, and applications—which take up the bulk of the 44 lines of text in claim 32. Indeed, there are *six* separate "configured" requirements in that claim, none reflected in the court's overbroad characterization. The court's formulation also misses claimed requirements for embedded objects and automatic invocation—important features highlighted *in the patent's title*. Appx39.

Putting aside the material inaccuracy of the district court's characterization, it is not clear that its description of the claims—"enabling interactivity with remote objects on a client computer browser using distributed computing"—is *even an*

abstract idea under the statute and controlling law. There can be no doubt that any "new and useful improvement" of a technological "process" is *not* a patent-ineligible abstract idea. Yet the district court effectively held that "enabling" a new and useful functionality in an existing computer network system is an abstract idea.

In addition to these errors, and among others, the district court's *Alice* step one analysis missed relevant advances over the art, improperly faulted the claims for not including unnecessary implementation details, and relied on distinguishable and non-controlling decisions from other district courts. *Infra* at 43-54.

This Court should find the asserted claims patent-eligible at *Alice* step one.

2. The asserted claims would be patent-eligible under *Alice* step two. While there should be no occasion for the Court to reach step two, the claims pass muster there, as well. Considered both individually and as an ordered combination, the claimed elements plainly involve more than the performance of well-understood, routine, and conventional activity on the then-existing World Wide Web. Indeed, while key Web designers did not believe robust interactive functionality was practicable in 1994, they changed their minds and adopted the claimed methods and systems for the Web after the inventors demonstrated how it could be achieved.

In a separate order prior to deciding the § 101 issue, the district court found "no evidence" that the claimed combination of elements was "routine." Appx13643. That should have resolved the issue when the court reached *Alice* step two. But it

did not. Because when the district court reached *Alice* step two, it failed to ask the question that *Alice* asks at step two. Instead, the court re-asked the same question it asked at step one. Unsurprisingly, it came to the same—again incorrect—answer.

The Court should reverse or vacate the judgments and remand.

ARGUMENT

A. Standard of Review.

Patent eligibility under § 101 is a question of law that may contain underlying issues of fact. *CardioNet, LLC v. InfoBionic, Inc.*, 955 F.3d 1358, 1367 (Fed. Cir. 2020). This Court reviews *de novo* the determination that claims are directed to patent-ineligible subject matter. *Id.* This Court reviews grants of summary judgment under the law of the regional circuit, here the Ninth Circuit—which reviews such grants *de novo*. *Roche Molecular Sys. v. Cepheid*, 905 F.3d 1363, 1368 (Fed. Cir. 2018) (citing *Leever v. Carson City*, 360 F.3d 1014, 1017 (9th Cir. 2004)).

B. The District Court Erred in Finding the Asserted Claims Patent-Ineligible Under § 101.

1. The asserted claims are patent-eligible under *Alice* step one.

The *Alice* path is well trodden, if at times poorly lit. Step one asks "whether the claims are directed to an abstract idea." *Uniloc USA, Inc. v. LG Elecs. USA, Inc.*, 957 F.3d 1303, 1306 (Fed. Cir. 2020). This inquiry examines the claims' "character as a whole" and their "advance over the prior art." *Koninklijke KPN N.V. v. Gemalto M2M GmbH*, 942 F.3d 1143, 1149-1150 (Fed. Cir. 2019). The Court must "articulate

what the claims are directed to with enough specificity to ensure the step one inquiry is meaningful." *Thales Visionix Inc. v. United States*, 850 F.3d 1343, 1347 (Fed. Cir. 2017). Thus, it "must look to the claims as an ordered combination, without ignoring the requirements of the individual steps." *McRO, Inc. v. Bandai Namco Games Am. Inc.*, 837 F.3d 1299, 1312 (Fed. Cir. 2016). And in addition to "the plain claim language," *Alice* step one also requires consideration of "statements in the written description, and the prosecution history, if relevant." *CardioNet*, 955 F.3d at 1374.

This Court has recognized the "difficulty inherent in delineating the contours of an abstract idea," and acknowledged that "all inventions at some level embody, use, reflect, rest upon, or apply … abstract ideas." *Core Wireless Licensing S.A.R.L. v. LG Elecs., Inc.*, 880 F.3d 1356, 1361 (Fed. Cir. 2018) (citations omitted). But it has found sure footing in one area: "We have routinely held software claims patent eligible under *Alice* step one when they are directed to improvements to the functionality of a computer or network platform itself." *Uniloc*, 957 F.3d at 1306-1307; *see also KPN*, 942 F.3d at 1149 ("Since *Alice*, we have found software inventions to be patent-eligible where they have made non-abstract improvements to existing technological processes and computer technology."); *SRI Int'l, Inc. v. Cisco Sys.*, 930 F.3d 1295, 1303 (Fed. Cir. 2019) (finding claims "directed to an improvement in computer network technology" patent-eligible); *Ancora Techs. V. HTC Am., Inc.*, 908 F.3d 1343, 1347 (Fed. Cir. 2018) ("[i]mproving security … can

be a non-abstract computer-functionality improvement"). In determining whether claims are directed to improving functionality in existing computer networks, the Court has also considered whether the improvement is accomplished "by a specific technique that departs from earlier approaches to solve a specific computer problem," *Ancora*, 908 F.3d at 1347, and how the claims compare with others the Court has found directed to patent-eligible subject matter, *Amdocs (Isr.) Ltd. v. Openet Telecom, Inc.*, 841 F.3d 1288, 1294 (Fed. Cir. 2016).

All of these considerations point unmistakably to the patent-eligibility of the '507 patent claims at issue in this appeal. These claims pass *Alice* step one.

a. The '507 patent claims are directed to specific and non-abstract improvements in computer network technology.

The asserted claims of the '507 patent are directed to an improved computer network system: a World Wide Web in which the major components of that computer network have been configured (or reconfigured) in specific ways to overcome particular problems and enable substantially improved functionality in the areas of interactivity, scalability, and security. The '507 patent disclosed a new approach in which the Web "functions differently" than it had before, *see Enfish LLC v. Microsoft Corp.*, 822 F.3d 1327, 1337 (Fed. Cir. 2016), and the asserted claims enabled that nascent but important computer network "system to do things it could not do before." *Finjan, Inc. v. Blue Coat Sys.*, 879 F.3d 1299, 1305 (Fed. Cir. 2018). These computer-network-directed claims are patent-eligible. *See id.*

The inventors identified a number of problems facing then-emerging open distributed hypermedia systems, and in particular the World Wide Web. Appx69.

Interactivity was severely limited: "while the present open distributed hypermedia system on the Internet allows users to locate and retrieve data objects it allows users very little, if any, interaction with these data objects. Users are limited to traditional hypertext and hypermedia forms of selecting linked data objects for retrieval and launching viewers or other forms of external software to have the data objects presented in a comprehensible way." Appx69 (6:27-33).

There were also critical limitations imposed by the processing power of end users' computers: "The open distributed hypermedia system provided by the Internet allows users to easily access and retrieve different data objects located in remote geographic locations on the Internet. … Today's browsers and viewers are not capable of performing the computation necessary to generate and render new views of these data objects in real time." Appx69 (5:36-52), Appx69 (6:22-33) ("Due to the relatively low bandwidth of the Internet (as compared to today's large data objects) and the relatively small amount of processing power available at client computers, many valuable tasks performed by computers cannot be performed by users at client computers on the Internet.").

And in prosecuting the claims of the '507 patent, the inventors called out an important security problem facing the Web in the early 1990s—in the approach

taken by other browsers, "a malicious Web author could specify the execution of any program on the user's client computer, which could lead to the Web author completely taking over control of the client computer, for example, to delete or damage files or data, if he or she so wished." Appx12842.

The claims of the '507 patent provide technological solutions to these technological problems by reciting new and specific configurations of a number of key components in the World Wide Web computer network.

In the then-existing Web, interactive objects were downloaded to the client computer and then displayed by an external helper application launched by the user, separately from any page in the Web browser. Appx69 (6:27-33). In the improved Web of the '507 patent, interactive objects are embedded within Web pages themselves, so that a user can "interact, within one or more World Wide Web pages, with at least part of one or more objects while at least part of each of said one or more objects is displayed to the user within at least one of said one or more World Wide Web pages." Appx78 (claim 32, 23:40-44). This relocation of the interactive object was a structural change to the Web that improved interactivity, and it was new—the Web adopted embedded-interactive-content architecture some years after the invention's priority date. Appx12024, Appx12121-12146, Appx11972.

The improved Web of the '507 patent also required the relocation of the interactive-content application. In the then-existing Web, helper applications were

external to the browser, and launched separately on the client computer "to have the data objects presented in a comprehensible way." Appx69 (6:27-33). In the '507 patent claims, the Web browser itself "has been configured with a plurality of different interactive-content applications." Appx78 (claim 32, 23:37-38). And when a particular application is "selected" by the browser, it is "automatically invoke[d] … to enable the user to employ the selected interactive content application to interact within the World Wide Web page with at least part of the object while at least part of the object is displayed to the user within the World Wide Web page." Appx78 (claim 32, 23:51-59). This specified location for an interactive-content application, and the provision for its automatic invocation, were further structural changes to the Web that improved interactivity, and they were also new—the conventional wisdom in this timeframe was that Web browsers should always be precluded from "firing off … executables on the client side." Appx19971, Appx56.

The interactive-content applications are not only specifically located and automatically invoked in the improved Web of the '507 patent; they are also broken up and distributed among multiple computers connected to the Web. That is, while the Web browser on the client computer is "configured with a plurality of interactive-content applications," each of those applications is in turn "configured to operate as part of a distributed application configured to enable a user to perform the interaction through the use of communications sent to and received from at least a portion of

the distributed application located on two or more distributed application computers connected to the World Wide Web distributed hypermedia network on the Internet, the two or more distributed application computers being remote from the client computer." Appx78 (claim 32, 23:36-37, 23:61-24:2). This structural change was also new, and it improved the scalability issues plaguing the then-existing Web: now end users would be "able to use a vast amount of computing power beyond that which is contained in the user's client computer." Appx69 (6:57-67).

In addition to the structural changes to Web pages and interactive-content applications, the improved Web of the '507 patent also offers Web browsers that are reconfigured to take advantage of the new computer network system's increased functionality. In this improved computer network, as noted, Web browsers are "configured with a plurality of different interactive content applications." Appx78 (claim 32, 23:37-38). They are also configured to "detect," using information transferred by the server computer, "at least part of an object to be displayed in a World Wide Web page," and further to "select," based on that information, an interactive-content application "from among the different interactive-content applications" with which the browser has been configured. Appx78 (claim32, 23:45-53). And once the Web browser has detected the object and selected the appropriate configured application, it "automatically invoke[s] the selected interactive-content application to enable the user to employ the selected interactive-content application

to interact within the World Wide Web page with at least part of the object while at least part of the object is displayed to the user within the World Wide Web page." Appx78 (claim 32, 23:54-59). This new browser configuration improved interactivity: it is now inline and automatic. It also improved security: only interactive-content applications with which a Web browser has been configured can be utilized in the new system. No longer can "a malicious web author … breach the web browser's security"—as was possible with the other browsers—"by making its own selection of the interactive-content application and launching an application on the client computer to take over the user's machine." Appx12842.

All of this new functionality is enabled by the specific configuration of the components in the improved Web computer network system recited in the independent claims at issue in this case. The discussion above cited to language from claim 32. Similar limitations covering each of these functional improvements in interactivity, scalability, and security are recited in system claim 19 and method claim 45. Appx77 (claim 19, 21:58-22:38), Appx78-79 (claim 45, 24:56-25:37).

The asserted dependent claims 37 and 39 (which depend from claim 32) and claims 24 and 26 (which depend from claim 19) add limitations, respectively, that "at least one or more coordination computers performs coordination of at least part of the distributed application to perform at least one task" (Appx77-78 (claims 24 & 37)) and "the two or more of the distributed application computers work together to

perform the at least one task" (Appx78 (claims 26 & 39)). These dependent claims further specify the invention's approach to addressing the scalability problem in the then-existing Web, and thus "each of these dependent claims" simply "narrows" the improved computer network system's "specific technical features or operations." *See CardioNet*, 955 F.3d at 1368-69.

Independent claim 45 is similar in scope to dependent claim 39, but adds limitations requiring "viewing transformations" done by remote computers. Appx79 (25:7-11). These viewing transformations help provide the 3D view depicted in the specification's Figures 9 and 10. Appx65-66, Appx74 (16:17-55). This additional limitation again "narrows" the improved computer network system's "specific technical features or operations." *See CardioNet*, 955 F.3d at 1368-69.

The asserted claims are thus directed to an improved computer network system, and not to an abstract idea. They pass *Alice* step one.

b. The '507 patent claims fall within a substantial line of precedent finding claims patent-eligible at step one.

Review of the Court's § 101 precedents confirms that the asserted claims of the '507 patent fall comfortably within a long line of cases finding software claims patent-eligible at *Alice* step one. *See Amdocs*, 841 F.3d at 1294.

The claims addressed in *KPN* recited two computer components, a "generating device" and "a varying device," with the "varying device" described as being "configured to modify the permutation in time." 942 F.3d at 1147-48. This

Court found the claims directed to patent-eligible subject matter, as they recited "a sufficiently specific implementation (i.e., modifying the permutation applied to the original data 'in time') of an existing tool (i.e., check data generating device) that improves the functioning of the overall technological process of detecting systematic errors in data transmissions." *Id.* at 1151. The claims here likewise recite a specific implementation (particular configurations of Web servers, Web browsers, Web pages, and interactive-content applications) of an existing tool (the World Wide Web open distributed hypermedia system) that improves the functioning of the overall technological process of disseminating interactive content over the Web. *KPN* holds that claims are patent-eligible when they "recite a specific means or method that solves a problem in an existing technological process." *Id.* at 1150. That is true here: configuring servers, browsers, pages, and applications in the specific manner recited in the asserted claims solves interactivity, security, and scalability problems that the inventors identified in the then-existing World Wide Web. *Supra* at 17-20.

The claims addressed in *Visual Memory* recited a memory system "having one or more programmable operational characteristics, said characteristics being defined through configuration by said computer based on the type of said processor," and "determin[ing] a type of data stored by said cache." *Visual Memory LLC v. NVIDIA Corp.*, 867 F.3d 1253, 1259 (Fed. Cir. 2017). The Court found these claims patent-eligible, explaining that "[c]onfiguring the memory system based on the type of

processor connected to the memory system is the improvement in computer technology to which the claims are directed"—different types of processors could now be accommodated without compromising system performance. *Id.* at 1262; *see also CardioNet*, 955 F.3d at 1369. The Court buttressed its conclusion that the claims at issue in *Visual Memory* were directed to "an improvement in computer systems" with the observation that "the patent includes a microfiche appendix having a combined total of 263 frames of computer code." 867 F.3d at 1261.

Just so here. The conclusion that the asserted claims are directed to improving an existing technology is buttressed by the fact that, as the '507 patent notes: "375 pages of [s]ource code on 4 microfiche Appendices A and B" were provided with the original specification. Appx70 (7:64-65). "The source code should be consulted to provide details of a specific embodiment of the invention in conjunction with the discussion of the routines in this specification. The source code in Appendix A includes NCSA Mosaic version 2.4 source code along with modifications to the source code to implement the present invention. Appendix B includes source code implementing an application program interface." Appx70 (7:65-8:5). And the specific configurations recited in the asserted claims allowed Web browsers to securely accommodate different types of interactive-content applications while *enhancing* system performance. *See Visual Memory*, 867 F.3d at 1262.

Visual Memory and *KPN* make this an easy case.

Other precedents addressing improvements to computer network systems further confirm the patent-eligibility of the claims asserted here. The claims at issue in *SRI* recited "using network monitors to detect suspicious network activity based on analysis of network traffic data, generating reports of that suspicious activity, and integrating those reports using hierarchical monitors." 930 F.3d at 1303. The Court found that the "focus of the claims" was on a "specific asserted improvement in computer capabilities"—that is, "providing a network defense system that monitors network traffic in real-time to automatically detect large-scale attacks." *Id.* Because the claims were "directed to an improvement in computer network technology," they were patent-eligible. *Id.* In finding the claims patent-eligible under *Alice* step one, the Court found significant that "the claims actually prevent the normal, expected operation of a conventional computer network." *Id.* at 1304.

Likewise here, the asserted claims enable improved interactivity, security, and scalability by reconfiguring network components so as to "prevent the normal, expected operation" of the then-existing World Wide Web open distributed hypermedia system. *See id.*; *supra* at 17-20. No longer are interactive objects downloaded from the Web onto client computers and manipulated with helper applications on computing-challenged client computers. Now Web browsers securely configured with interactive-content applications detect parts of interactive objects embedded within Web pages, select and automatically invoke the

appropriate interactive-content application to permit manipulation of those embedded interactive objects, and have access to additional computing power through remote computers running portions of the distributed applications. *Supra* at 24. If the claims in *SRI* were directed to a patent-eligible improvement in computer network technology, then *a fortiori* so are the claims at issue here.

That analysis holds even more true with respect to the claims at issue in *DDR Holdings, LLC v. Hotels.com, L.P.*, 773 F.3d 1245 (Fed. Cir. 2014). Those claims, like the claims here, addressed "a challenge particular to the Internet." *Id*. at 1257. But unlike the claims here, which address *technological* challenges particular to the Internet, the claims in *DDR* addressed an Internet-related "*business* challenge (retaining website visitors)." *Id.* (emphasis added); *see also id.* at 1258 ("retaining control over the attention of the customer in the context of the Internet"). The Court nevertheless found the claims patent-eligible. As the Court explained, "[i]nstead of the computer network operating in its normal, expected manner by sending the website visitor to the third-party website that appears to be connected with the clicked advertisement, the claimed system generates and directs the visitor to [a] hybrid web page that presents product information from the third-party and visual 'look and feel' elements from the host website." *Id.* at 1258-59. Thus, the claims there specified "how interactions with the Internet are manipulated to yield a desired

result—a result that overrides the routine and conventional sequence of events ordinarily triggered by the click of a hyperlink." *Id.*

The claims at issue here likewise specify "how interactions with the Internet are manipulated to yield a desired result" (*see id.*)—though here, that result involves technological improvements to Web functionality in the areas of interactivity, security, and scalability. And likewise here, the desired result "overrides the routine and conventional sequence of events ordinarily triggered by the click of a hyperlink" in the then-existing World Wide Web. *See id.*; *supra* at 17-19. The claims here, no less than the claims in *DDR*, are "necessarily rooted in computer technology in order to overcome … problem[s] specifically arising in the realm of computer networks." 773 F.3d at 1257; *see also Amdocs*, 841 F.3d at 1300-1301 (finding patent-eligible claims that depended on "the invention's distributed architecture"); *Core Wireless*, 880 F.3d at 1363 (finding patent-eligible claims that improved the "speed of a user's navigation through various views and windows" as "directed to an improvement in the functioning of computers, particularly those with small screens").

Another line of precedent confirms that "[i]mproving security" qualifies as "a non-abstract computer-functionality improvement if done by a specific technique that departs from earlier approaches to solve a specific computer problem." *Ancora*, 908 F.3d at 1347. That was found to be true in the *Ancora*, *Finjan*, *TecSec*, and *Cosmokey* cases. *See Ancora*, 908 F.3d at 1347-49; *Finjan*, 879 F.3d at 1305-06

(finding patent-eligible claims reciting a "behavior-based" virus scan directed to "an improvement in computer functionality"); *TecSec, Inc. v. Adobe Inc.*, 978 F.3d 1278, 1296 (Fed. Cir. 2020) (finding patent-eligible claims "directed to improving a basic function of a computer data-distribution network, namely, network security"); *Cosmokey Sols. GMBH & Co. KG v. Duo Sec. LLC*, 15 F.4th 1091, 1099 (Fed. Cir. 2021) (finding patent-eligible claims that "improve[d] upon the prior art by providing a simple method that yields higher security").

These cases further support the patent-eligibility of the asserted claims. As the inventors explained to the PTO during prosecution, the asserted claims of the '507 patent improve Web security and solve a specific vulnerability that threatened Web users with a specific technique that departs from earlier approaches. In contrast to other browsers, only interactive-content applications with which a Web browser has been configured can be utilized in the new system. No longer can "a malicious web author" use an unapproved interactive-content application to "breach the web browser's security [and] take over the user's machine." *Supra* at 34; *see also Ancora*, 908 F.3d at 1349 (looking to "[t]he prosecution history" for confirmation regarding the claimed "change" from prior "techniques for computer security").

The Court's decision in *Ancora* further suggests that patent-eligible computer improvements are reflected in claims that recite particular locations for particular structures in the computer system. *Id.* at 1347-49. The patent-eligible claims there

recited "a structure containing a license record [that] is stored in a particular, modifiable, non-volatile"—and less vulnerable—"portion of the computer's BIOS." *Id.* at 1347. And in *BASCOM* the Court found patent-eligible claims that recited "the installation of a filtering tool at a specific location, remote from the end-users, with customizable filtering features specific to each end user." *BASCOM Global Internet Servs. v. AT&T Mobility LLC*, 827 F.3d 1341, 1350 (Fed. Cir. 2016). This design gave "the filtering tool both the benefits of a filter on a local computer and the benefits of a filter on the ISP server." *Id.* Similarly, the asserted claims of the '507 patent recite particular locations for particular structures in the open distributed hypermedia system of the World Wide Web. Interactive objects are embedded in Web pages, and interactive-content applications are relocated into Web browsers—with portions of the applications broken up and distributed to computers remote from the client. And this design results in functionality benefits including increased interactivity, increased security, and increased scalability. *Supra* at 17-20.

These many cases confirm that the asserted claims of the '507 patent are directed to a patent-eligible improvement in computer network systems, and not to any abstract idea. These claims "are not directed to using a computer as a tool—that is, automating a conventional idea on a computer." *SRI*, 930 F.3d at 1304. They are unmistakably directed to "an improvement to computer functionality itself." *Id.*

c. The district court erred in its analysis at step one.

Because *Alice* step one raises a legal question that is reviewed *de novo*, the district court's analysis on this issue, and its conclusion that the asserted claims are directed to an abstract idea, carries no weight. *See CardioNet*, 955 F.3d at 1367. The court's analysis and conclusion can bear little weight, in any event. The district court found that "the asserted claims are directed to the abstract idea of enabling interactivity with remote objects on a client computer browser using distributed computing." Appx10. This finding is in error for a number of reasons.

1. The district court's description of the claims is overgeneralized and "untethered from the language of the claims." *See Enfish*, 822 F.3d at 1337.

The step one "directed to" analysis "called for by [this Court's] cases depends on an accurate characterization of what the claims require and of what the patent asserts to be the claimed advance." *TecSec*, 978 F.3d at 1294. Courts must thus "be careful to avoid oversimplifying the claims" by "looking at them generally and failing to account for the[ir] specific requirements." *Id.* at 1292-93; *see also McRO*, 837 F.3d at 1312-13 ("[courts] must look to the claims as an ordered combination, without ignoring the requirements of the individual steps"). And courts further "err[] by disregarding the written description's recitation of the advantages of the claimed invention." *CardioNet*, 955 F.3d at 1371. The decision in *TecSec* is instructive. The defendant there argued that "the claims are directed to the impermissibly abstract

idea of managing access to objects using multiple levels of encryption." *TecSec*, 978 F.3d at 1294. This Court rejected that characterization as "materially inaccurate," noting that the claim "goes beyond managing access to objects using multiple levels of encryption," and "expressly requires, as well, accessing an 'object-oriented key manager' and specific uses of a 'label' as well as encryption for the access management." *Id.* at 1294-95. "To disregard those express claim elements" impermissibly "overgeneraliz[ed] the claim." *Id.* at 1295.

The district court's "directed to" characterization suffers from flaws similar to the "directed to" characterization rejected in *TecSec*. It fails to account for a number of express limitations as well as an important advantage of the claimed invention described in the intrinsic record. Appx10.

The court's characterization, for example, fails to account for the World Wide Web limitations. Claim 32 recites the "World Wide Web" *fourteen* times. Appx78 (claim 32). The Web played an important role in the prosecution of the '507 patent and in the parties' fights over preclusion and OTDP issues, among others, during the litigation. Appx11966-11967, Appx12827-12952, Appx, Appx13633-13649. The district court's characterization also fails to account for the recitation of the configured components required by the claims—which takes up the bulk of the 44 lines of patent text that the court examined in claim 32. It ignores the requirements for specific configurations of browsers, pages, interactive-content applications, and

the structured information transferred by servers onto the Web. Indeed, there are *six* separate "configured" requirements in claim 32. Appx78 (claim 32). There is more: the court's characterization misses the requirements that "objects" can be "displayed to the user within … World Wide Web pages," and that the "interactive- content application" can be "automatically invoke[d]"—both important limitations that are reflected *in the title of the patent itself*. Appx78 (claim 32), Appx39 ("distributed hypermedia method and system for **automatically invoking** external application providing interaction and display of **embedded objects** within a hypermedia document") (emphasis added). The district court's characterization also failed to account for the security improvement captured in the "configured" requirements in the claims—highlighted by the inventors during prosecution of the '507 patent claims as an important advance over the alleged prior art. *Supra* at 8.

It is inconceivable that "an accurate characterization of what the claims require" could ignore their ubiquitous "World Wide Web" usage, their central "configured" requirements, and additional express elements capturing important advances and benefits over the prior art. *See TecSec*, 978 F.3d at 1294; *supra* at 8, 17-20. In disregarding *virtually all* of the specific requirements at the center of the asserted claims, the district court left itself without any "sound" basis to "conduct … the inquiries into the problem being addressed and whether the line of specificity of solution has been crossed." *TecSec*, 978 F.3d at 1294.

2. The district court's characterization of the asserted claims as "directed to the abstract idea of enabling interactivity with remote objects on a client computer browser using distributed computing" (Appx10) thus reflects a materially inaccurate overgeneralization. But at another level, it is not at all clear that the district court's characterization of the claims *actually reflects an abstract idea*. To be sure, there is "difficulty inherent in delineating the contours of an abstract idea." *Visual Memory*, 867 F.3d at 1259. But the statute, *Alice*, and this Court's cases are clear on a critical point: any "new and useful improvement" of a technological "process" is *not* a patent-ineligible abstract idea. 35 U.S.C. § 101; *see also Alice Corp. Pty. Ltd. v. CLS Bank Int'l*, 573 U.S. 208, 223, 225 (2014); *Visual Memory*, 867 F.3d at 1259-60.

If a group of inventors has purported to "enabl[e] interactivity with remote objects on a client computer browser using distributed computing"—according to the district court, that is what happened here—it is hard to see how that asserted accomplishment could fairly be characterized as anything other than a new and useful improvement of an existing technological process. The inventors of the '507 patent certainly did not feel they had spent their energies pursuing an abstraction when they wrote "375 pages of [s]ource code" (Appx70 (7:64)) that enabled them to manipulate remote and complex 3D images on their client computers "as if they had a control panel to [a] supercomputer" (Appx12203). And consider if this question were posed to Web users in 1994: would enabling interactivity with remote

objects on your browser using distributed computing constitute a new and useful improvement of your computer network? Their answer would undoubtedly be: yes. No one in 1994 would have mistaken that technological improvement for a mere abstraction. The § 101 decisional law can be difficult to traverse, and the district court took a misstep in this case. It effectively held that "enabling" a new and useful functionality in an existing computer network system is an abstract idea. Appx10. That conflicts with the statute, with *Alice*, and with this Court's precedents.

3. The district court's analysis at step one also stumbled at other points.

a. Regarding the critical technological improvement question, the court observed that, "[n]otably, the specification does not state that the claimed invention improves the computing capacity of client computers or improves the availability of bandwidth on the internet." Appx5, Appx14 ("The specification implies the possibility that the computing capacity of client computers and bandwidth constraints unchanged despite the claimed invention."). There is nothing notable, however, about that observation. The '507 patent is not directed to improvements in client computers or bandwidth constraints. It is directed to improvements in open distributed hypermedia computer networks—the World Wide Web in particular. Limited bandwidth and capacity of client computers posed (and continue to pose, despite many advances) technological problems that limited the useful functionality of the Web. The claimed invention *overcame* those technological problems and

improved the useful functionality of the Web *notwithstanding* the hurdles posed by limited bandwidth and limited capacity of client computers. Indeed, the district court appeared to recognize as much in its background discussion: "[t]he specification discusses examples of how the claimed invention circumvents the problems of client computers' limited computing power and bandwidth constraints." Appx5. Given that concession, only one legal conclusion was possible: the claims are directed to a patent-eligible improvement in computer networks.

b. The district court also reasoned that claim 32 does "not specify *how* to 'configure' the interactive-content application and the distributed application," does "not contain limitations regarding *how* the client computer and the remote computers *should* communicate," and does "not require that computing work … be distributed in *any* particular way among the remote computers relative to the client computer." Appx12. Thus, the court concluded, claim 32 "requires only *results* (that interactivity on the client computer browser be enabled via distributed computing), without specifying *how* to achieve them." Appx12. This analysis misunderstands the law, and improperly shifts from an overgeneralized and insufficiently specific characterization of the invention to a meticulous search for unnecessary and hyper-specific implementation details in the claims.

Visual Memory is instructive: the Court explained that the patent-eligible "improvement in computer technology" there was "[c]onfiguring the memory

system based on the type of processer connected to the memory system." 867 F.3d at 1261-62. "*Alice* requires no more from the claims or the specification to support [the] conclusion that the claims are not directed to an abstract idea." *Id.* There was no requirement to recite "implementation details of how to configure a programmable operational characteristic of a memory system," as "a patent need not teach, and preferably omits, what is well known in the art." *Id.*

The asserted claims are directed to an improved computer network system with increased functionality in the areas of interactivity, security, and scalability. *Supra* at 17-20. And the claims recite *how* to achieve those results with specific configurations of the key Web components and structures. For example, claim 32 recites a Web environment in which a Web browser (1) "has been configured with a plurality of different interactive-content applications," each of which (2) is "configured to enable a user to interact, within one or more Web pages, with at least part of one or more objects while at least part of each of said one or more objects is displayed to the user within at least one of said one or more World Wide Web pages." Appx78 (claim 32). That Web browser must also be (3) "configured to" select and (4) "automatically invoke" one of the interactive-content applications, which must in turn be (5) "configured to operate as part of a distributed application" that has further been (6) "configured to enable the user to perform the interaction through the use of communications sent to and received from at least a portion of the distributed

application located on two or more distributed application computers connected to the World Wide Web ….” Appx78 (claim 32); *see generally supra* at 17-22.

The asserted claims are thus far more specific than the claims found patent-eligible in *Visual Memory*. “*Alice* requires no more … to support [the] conclusion that the claims are not directed to an abstract idea.” 867 F.3d at 1261-62. All that remains, as in *Visual Memory*, are implementation details appropriately omitted from the claims. There is no need to specify that, for example, the Web browser should be configured with five interactive-content applications, or that the object should be viewed in the upper-right-hand corner of the Web page, or that the applications should be programmed using a particular computer language, or that the computing should be broken up so that 70% is performed on one remote computer, and 30% performed on the other. None of those implementation details relate to the “focus of the claimed advance over the prior art,” and so none are relevant to the *Alice* step one analysis. *See KPN*, 942 F.3d at 1149; *Cosmokey*, 15 F.4th at 1097. Furthermore, as in *Visual Memory*, 867 F.3d at 1261, any practitioners with questions regarding implementation details have the 375 pages of source code that the inventors submitted with the original specification available to them. Appx70.

c. The district court also reasoned that the “breadth” of claim 32’s language, “which is not restricted to any specific way of enabling the interactivity on the client computer browser using distributed computing, raises preemption issues.” Appx15.

This analysis only works if virtually every specific limitation in claim 32 is disregarded. If the district court is right—and "the asserted claims are directed to the abstract idea of enabling interactivity with remote objects on a client computer browser using distributed computing" (Appx10)—then the claims come nowhere close to preempting that idea. An implementation of the court's characterization could be done, for example, without configuring the browser with interactive-content applications. Such an implementation would avoid the claims. It could be done without embedding the remote objects in other network documents. It could be done without automatically invoking applications to permit interaction with inline objects. It could be done by distributing the computing power of the client, rather than by distributing the interactive-content application. There are untold numbers of ways the district court's "abstract idea" could be implemented without practicing the asserted claims. There is no preemption issue here that might "signal," as the district court suggested, "patent-ineligible subject matter." Appx16 (citation omitted).

d. The district court cited to a number of other district court cases as supporting its conclusion, including in particular *Device Enhancement LLC v. Amazon.com, Inc.*, 189 F. Supp. 3d 392 (D. Del. 2016). Appx16-17. But the claim in that case, as the district court explained, simply "required that tasks between a 'client-side application' on the terminal device and 'remote application' on the server be 'dynamically split[]' according to 'predetermined computational resources

and inherent capabilities.'" Appx16. "The claim further required communications over a network between the server and the terminal device to exchange data, deliver the content, and exchange messages." Appx16. And the district court in *Device Enhancement* found that claim patent-ineligible based on a preemption analysis. 189 F. Supp. 3d at 405. As seen, a preemption analysis does not point to patent-ineligibility here, and unlike the claim in *Device Enhancement*, the claims here are directed to improving the functionality of an existing computer network system. None of the other district court cases cited by the district court (Appx17) overcomes, or undermines in any way, the substantial line of precedent from this Court that supports patent-eligibility addressed above. *Supra* at 35-42.

e. The district court also appeared to misunderstand the role of the intrinsic record in the *Alice* step one analysis. It found, for example, that Figures 6 and 10 "are incapable of saving [c]laim 32 from patent-ineligibility" because, while they "describe in general terms how the client computer and remote computers could be structured to enable interactivity on the client computer," they "do not teach specifically how to distributing the computer work," and in any event, "none of the specification's descriptions of these figures are incorporated into the claims." Appx20. At *Alice* step one, however, the figures and descriptions in the specification are relevant to determining whether the claims as a whole are "directed to an improvement in computer network technology." *SRI*, 930 F.3d at 1303-04; *see id.*

("[t]he specification explains that the claimed invention is directed to solving these weaknesses in conventional networks"). The district court's own analysis confirms that here, the specification supports that conclusion of patent-eligibility.

On the other hand, the district court refused to consider at all the security improvement enabled by the claims on the ground that it found "no indication in the intrinsic evidence that the claimed invention was intended to solve *any* security vulnerabilities." Appx21 (noting that the specification "does not discuss hacking vulnerabilities"). While the intrinsic record is relevant to determining whether the claims are directed to a technological improvement, it does not and cannot supplant the priority of *the actual claim language* in the *Alice* step one analysis. *See TecSec*, 867 F.3d at 1258. And here the claims in fact provide a security improvement over other browsers through a specific technique that departed from earlier approaches. *Supra* at 19-20; *Ancora*, 908 F.3d at 1347. In any event, as discussed above, the intrinsic evidence *does* show that the claimed invention was intended to solve a particular security vulnerability then plaguing the World Wide Web. *Supra* at 34.

f. The district court focused its step one analysis on claim 32, but it also found claims 19, 24, 26, 37, 39, and 45 patent-ineligible for similar reasons. Those claims are patent-eligible for the reasons discussed above. *Supra* at 34-35. And while independent claims 19 and 32 are similar, dependent claims 24, 26, 37, and 39 all add specific limitations reciting further improvements to the scalability functionality

of the Web—also as discussed above. *Supra* at 22, 34-35. With respect to claim 45, the district court recognized this claim recited additional "viewing transformations" limitations. Appx29; *supra* at 23. The court discounted the relevance of the patent's teachings on that element, however, on the ground that, "[a]t Eolas' request, the term 'viewing transformations' was construed to exclude embodiments in the specification." Appx29. But the court must have been confused. Eolas proposed the plain and ordinary meaning for the construction of that claim term (Appx4946), and its construction—"operations performed on data for visual display to a user" (Appx29)—does not exclude any embodiment in the specification. In any event, all of the asserted claims are patent-eligible for the reasons discussed above.

2. The asserted claims would be patent-eligible under *Alice* step two.

Because the claims are patent-eligible under *Alice* step one, there should be no occasion to reach *Alice* step two. *See SRI*, 930 F.3d at 1304. But if the Court were to proceed to step two, it should find patent-eligibility there, as well.

Alice step two requires examining the elements of the claims individually and as an ordered combination to determine whether they contain an "inventive concept" that will "transform" the "claimed abstract idea into a patent-eligible application" of that idea. *Aatrix Software, Inc. v. Green Shades Software, Inc.*, 882 F.3d 1121, 1228 (Fed. Cir. 2018). That inventive concept will be found, and *Alice* step two satisfied, when the claims "involve more than performance of 'well-understood, routine, [and]

conventional activities previously known to the industry.'" *Berkheimer v. HP Inc.*, 881 F.3d 1360, 1367 (Fed. Cir. 2018). The "routine" nature of a claimed combination "goes beyond" what was known in the prior art—the "mere fact that something is disclosed in a piece of prior art" does "not mean it was well-understood, routine, and conventional." *Id.* "[W]hether a claim element or combination of elements is well-understood, routine and conventional" is "a question of fact" that "must be proven by clear and convincing evidence." *Id.* This means that summary judgment on step two—as the district court granted here—is only permissible when "there is no genuine issue of material fact regarding whether the claimed element or claimed combination is well-understood, routine, [and] conventional." *Id.* at 1367-68.

a. The technological improvements recited in the '507 patent claims were not well-understood, routine, or conventional.

The claimed elements, considered both individually and as an ordered combination, plainly involve more than the performance of well-understood, routine, and conventional activity on the then-existing World Wide Web.

Specific elements recited in the asserted claims were new and unconventional: browsers were not configured with applications that were automatically invoked to permit interactivity. In fact, Web designers were dead set against "firing off … executables on the client side" at the time of the invention. Appx19971-19972, Appx12218, Appx13100-13102; *supra* at 16. And interactive objects were not embedded in Web pages. Web designers also emphatically rejected "making

[inlined] generic inclusions available" in 1994—although they changed their minds some years later. Appx12216-12217, Appx13097-13099, Appx19972; *supra* at 15.

The ordered combination of elements was also new and unconventional. The reason Web designers rejected automatic invocation and embedded objects in 1994 was that they had not come up with the combination of elements that would permit implementation of those features in a secure and scalable manner. *Supra* at 33-34. It was the combination of configured Web components recited in the asserted claims that made "firing off … executables" secure, and embedding computation-intensive "generic inclusions" into Web pages practicable. *Supra* at 19-20. There is *no* evidence, whatsoever, that Web servers, Web browsers, Web pages, and interactive-content applications were conventionally and routinely configured in the combined manner required by the asserted claims. There is substantial evidence, on the other hand, that these claims recite far more than the performance of well-understood, routine, and conventional activities previously known to the industry. Appx12006-12169, Appx12216-12233, Appx12835-12853, Appx13097-13099, Appx13100-13109, Appx12967-13029, Appx13643-13644, Appx19689-19690. As in *DDR*, the claimed methods and systems "override[] the routine and conventional sequence of events ordinarily triggered by the click of a hyperlink." 773 F.3d at 1258-59.

Indeed, the district court found as much. In an order that stood—and still stands—as law of the case, *see Arizona v. California*, 460 U.S. 605, 618 (1983), the

district court found "no evidence" that it was "routine" to adapt a "method of serving digital information in … a distributed hypermedia network environment" to a "World Wide Web browser … configured to: (a) select and interactive-content application, … and (b) automatically invoke the selected interactive-content application to enable the user to employ the selected interactive-content application to interact within the World Wide Web." Appx13643. That finding should have resolved the issue in Eolas's favor when the district court reached *Alice* step two.

b. The district court erred in its analysis at step two.

But rather than ask the controlling question at *Alice* step two—whether the claim limitations and their ordered combination reflected nothing more than well-understood, routine, and conventional activity in the field of open distributed hypermedia network systems—the district court collapsed its step two analysis into its analysis at step one. The court effectively posited that the ordered combination of limitations "embody the abstract idea to which the asserted claims are directed, which is enabling interactivity with remote objects in client computer browsers using distributed computing." Appx32. Reasoning that it had "analyzed" the relevant claim limitations "in detail at step one and found [them] to be directed to an abstract idea, and not a specific technological solution," the district court concluded that those elements, whether individually or as an ordered combination, "therefore, cannot supply the requisite inventive concept at step two." Appx32.

The district court's reliance on its step one analysis at *Alice* step two rendered its *Alice* step two conclusion infirm on two levels. (1) As a matter of law and logic, the *Alice* step two analysis *cannot be identical* to the *Alice* step one analysis—that would render *Alice* step two meaningless. The district court thus erred in applying the *Alice* step one analysis twice. (2) Furthermore, the district court's *Alice* step one analysis was flawed for the reasons discussed above. *Supra* at 43-54. Applying the same flawed analysis twice only multiplied its erroneous results.

With respect to its earlier finding that there was no evidence that the asserted claims recited a "routine" application of Web technology (Appx13643), the district court reasoned that this finding had been made in the context of "resolving Defendants' summary judgment motion on OTDP," and there was no authority holding that the court's "analysis and findings in the context of OTDP bear on the question of patent-eligibility under § 101." Appx5. That is not quite right.

The relevant step of the OTDP "analysis is analogous to the obviousness inquiry under 35 U.S.C. § 103." *UCB, Inc. v. Accord Healthcare, Inc.*, 890 F.3d 1313, 1323 (Fed. Cir. 2018). And while the analyses under §§ 101 and 103 are not the same, this Court has suggested that the step two analysis under § 101 requires *more* than the obviousness analysis under § 103. *See BASCOM*, 827 F.3d at 1349-50 (rejecting "the district court's analysis of the ordered combination of limitations" under step two, which "look[ed] similar to an obviousness analysis under 35 U.S.C.

§ 103," and explaining that "[t]he inventive concept inquiry requires more than recognizing that each claim element, by itself, was known in the art"); *see also Berkheimer*, 881 F.3d at 1369; *Cosmokey*, 15 F.4th at 1098. The district court never questioned its finding that there was—at least—a material issue of fact regarding the conventionality of the claim elements under its § 103 analysis. *A fortiori*, therefore, there should have been—at least—a material issue of fact regarding the conventionality of the claim elements under its § 101 step two analysis.

Eolas believes that the Court can and should determine that the asserted claims are patent-eligible as a matter of law. But in the event that the Court reaches *Alice* step two, and further concludes that it cannot find patent-eligibility as a matter of law under step two, then that particular issue should be remanded back to the finder of fact. In all events, reversal and remand is appropriate.

CONCLUSION

For these reasons, the judgments should be reversed or vacated and remanded for further proceedings.

Respectfully submitted,

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ADDENDUM

EOLAS TECHNOLOGIES, INCORPORATED v. AMAZON.COM, INC., GOOGLE, LLC, WALMART, INC., and GOOGLE LLC v. EOLAS TECHNOLOGIES.

Nos. 22-1932, 22-1933, 22-1934, 22-1935

APPELLANT'S ADDENDUM

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Order and Judgment

Patent

UNITED STATES DISTRICT COURT

FOR THE NORTHERN DISTRICT OF CALIFORNIA

EOLAS TECHNOLOGIES INCORPORATED,

Plaintiff,

v.

AMAZON.COM INC.,

Defendant.

EOLAS TECHNOLOGIES INCORPORATED,

Plaintiff,

v.

GOOGLE LLC,

Defendant.

EOLAS TECHNOLOGIES INCORPORATED,

Plaintiff,

v.

WALMART INC.,

Defendant.

GOOGLE LLC,

Plaintiff,

v.

EOLAS TECHNOLOGIES INCORPORATED,

Defendant.

Lead Case No. 17-cv-03022-JST

ORDER GRANTING DEFENDANTS' MOTION FOR SUMMARY JUDGMENT UNDER 35 U.S.C. § 101; DENYING DEFENDANTS' MOTION FOR SUMMARY JUDGMENT OF NON-INFRINGEMENT AS MOOT; DENYING PLAINTIFFS' MOTION FOR SUMMARY JUDGMENT AS MOOT; DENYING MOTIONS TO EXCLUDE OR STRIKE EXPERT TESTIMONY AS MOOT

Re: ECF Nos. 829, 832, 686, 689, 696, 698, 699, 703, 706, 708, 710, 714

United States District Court
Northern District of California

Before the Court are several motions: (1) Defendants' motion for summary judgment on the grounds that the asserted claims are invalid under 35 U.S.C. § 101 or are not infringed, ECF No. 832; (2) Plaintiffs' motion for summary judgment as to certain of Defendants' affirmative defenses, ECF No. 829; and (3) several motions to exclude or strike certain expert testimony, ECF Nos. 686, 689, 696, 698, 699, 703, 706, 708, 710, and 714.

For the reasons discussed below, the Court will grant Defendants' motion for summary judgment that the asserted claims are invalid under 35 U.S.C. § 101 and will deny the rest of the pending motions as moot.[1]

I. BACKGROUND

A. Procedural History

On November 24, 2015, Plaintiff Eolas filed three actions in the Eastern District of Texas alleging infringement of U.S. Patent No. 9,195,507 ("the '507 patent") by Defendants Amazon.com, Inc. ("Amazon"), Google LLC ("Google"), and Wal-Mart Inc. ("Walmart") (collectively, "Defendants"). *See Eolas Techs. Inc. v. Amazon.com, Inc.*, No. 6:15-cv-1038 (E.D. Tex.); *Eolas Techs. Inc. v. Google Inc.*, No. 6:15-cv-1039 (E.D. Tex.); *Eolas Techs. Inc. v. Wal-Mart Stores, Inc.*, No. 6:15-cv-1038 (E.D. Tex.). Eolas alleges that various products of each Defendant directly infringe the asserted claims of the '507 patent. *See* ECF No. 830-5 at 14. Defendants contend, and Eolas does not dispute, that the only asserted claims of the '507 patent that remain at issue at this stage of the litigation are the following: Claims 32, 37, 39, 19, 24, 26, and 45.

On February 8, 2016, the three actions were consolidated for pretrial purposes. *See* ECF No. 22. In 2017, the three actions were transferred to the Northern District of California. ECF Nos. 251, 326, 329. A fourth case was filed in the Northern District of California on November 25, 2015 (*Google LLC v. Eolas Technologies Incorporated*, Case No. 15-cv-05446) and this fourth case was consolidated for pretrial purposes with the other three actions on March 10, 2020. *See* ECF No. 582. The lead case is *Eolas Technologies Incorporated v. Amazon.com, Inc.*, Case No.

[1] Pursuant to Civil Local Rule 7-1(b), the Court concludes that these motions are appropriate for determination without oral argument.

17-cv-3022. *Id.*

On May 31, 2016, while first three actions were still pending in the Eastern District of Texas, Eolas filed an early summary judgment motion of "no invalidity" under 35 U.S.C. § 101. *See* ECF No. 112. The District Court for the Eastern District of Texas ("Texas district court") denied the motion without prejudice.[2] ECF No. 208. On December 8, 2016, the Texas district court construed certain disputed terms in the '507 patent. *See* ECF No. 212.

Once the consolidated actions were assigned to the undersigned, Defendants moved for reconsideration of the construction of one of the disputed terms ("interactive-content application"), ECF No. 619, which this Court denied, ECF No. 628.

On March 25, 2020, Defendants moved for summary judgment on obviousness-type double patenting, double patenting, and various preclusion doctrines. ECF No. 592. On April 27, 2021, the Court denied Defendants' motion on the basis that Defendants had not met their burden to show that the asserted claims are invalid under any of the doctrines that Defendants had invoked. ECF No. 655.

B. The '507 patent

The '507 patent is titled "Distributed Hypermedia Method and System for Automatically Invoking External Application Providing Interaction and Display of Embedded Objects Within a Hypermedia Document," and it was issued on November 24, 2015. *See* '507 patent, ECF No. 832-2. According to the specification, the claimed methods and systems "allow[] a user at a client computer connected to a network to locate, retrieve and manipulate objects in an interactive way[.]" *Id.* at 6:57-59.

The specification of the '507 patent describes the context of the claimed invention as follows. The internet provides an "open distributed hypermedia system" that allows computers

[2] The order resolving this motion was sealed and not filed on the docket. The docket entry that was entered when the order was emailed to the parties is ECF No. 208. Neither side has filed a copy of this order in connection with their summary judgment-related briefs. Eolas represents, and Defendants do not dispute, that the Texas district court denied this motion without prejudice, "including on the grounds that the court had not yet decided claim construction." *See* ECF No. 840-3 at 21 (citing "Dkt. 208").

connected to the internet to display and retrieve objects located at remote computers by clicking on links. *Id.* at 2:4-16. When a user clicks on a link, a request that includes the address of the object is sent by the user's computer via the internet, which is ultimately received by the server computer where the object is located. *Id.* at 5:1-21. The server processes the request, locates the object, and transfers a copy back to the user via the internet. *Id.* When the user's computer receives the object, it is displayed to that user. *Id.*

The specification states that a shortcoming of "the present open distributed hypermedia system on the Internet" is that, while it "allows users to locate and retrieve data objects," it "allows users very little, if any, interaction with these data objects." *Id.* at 6:25-34. The specification further explains that the viewing of and interaction with large objects in real time is particularly useful in a variety of contexts, including in the fields of medicine and meteorology, but such activities require employing "visualization techniques and real time computer graphics methods," which are "bandwidth-intensive and compute-intensive [sic] and often require multiprocessor arrays and other specialized graphics hardware to carry them out in real time." *Id.* at 5:62-68 to 6:1-13. The specification states that users of client computers cannot effectively perform these bandwidth-intensive and computing-intensive tasks as a result of "the relatively low bandwidth of the Internet (as compared to today's large data objects) and the relatively small amount of processing power available at client computers[.]" *Id.* at 6:22-24.

According to the specification, "it is desirable to have a system that allows the accessing, display and manipulation of large amounts of data, especially image data, over the Internet to a small, and relatively cheap, client computer." *Id.* at 6:18-21. The specification provides that the claimed invention meets this need because it "allows a user at a client computer connected to a network to locate, retrieve and manipulate objects in an interactive way," *id.* at 6:45-59. The claimed invention, according to the specification, enables users of client computers connected a network to interact with objects (including large objects) displayed on a web browser through communications sent over a "distributed" network environment, wherein such interaction is achieved by enabling the user of the client computer to interact via network communications with an application located on a remote computer. *Id.* at 6:45-67. This allows the user of the client

computer "to use a vast amount of computing power beyond that which is contained in the user's computer," namely the computing power of remote computers. *Id.* at 6:65-67. Notably, the specification does not state that the claimed invention improves the computing capacity of client computers or improves the availability of bandwidth on the internet.

The specification discusses examples of how the claimed invention circumvents the problems of client computers' limited computing power and bandwidth constraints; these examples involve having remote computers perform resource-intensive computations required to enable interactivity in the client computer browser and then limiting the amount of data they send back to the client computer (such as by sending back only the results of their computations). *See, e.g., id.* at 7:1-35. For instance, the specification states that several remote computers can process three-dimensional images "in a distributed manner" to enable a user of a client computer to view and interact with the images. *Id.* The specification implies that this distributed processing of the images circumvents the computation limitations of client computers because the resource-intensive "calculations" required for manipulating the three-dimensional images "may be performed by remote distributed computer systems" instead of by the client computer individually. *Id.* This arrangement also reduces "the need for a high band-width data connection" because the distributed remote computers can, after performing the necessary computations, transmit to the client computer only the data that is necessary to "update the image" on the client computer. *Id.* at 7:15-23; *see also id.* at 10:60-64 ("It will be readily seen that application server 220 can advantageously use server computer 204's computing resources to perform the viewing transformation much more quickly than could application client 210 executing on client computer 200. Further, by only transmitting the updated frame buffer containing a new view for the embryo image, the amount of data sent over network 206 is reduced."); *id.* at 11: 33-38 ("computer systems located remotely on the network can be used to provide the computing power that may be required for certain tasks and to reduce the data bandwidth required by only transmitting results of the computations").

Importantly, the '507 patent states that "[t]he specification and drawings are . . . to be regarded in an illustrative rather than a restrictive sense, the invention being limited only by the

provided claims." *Id.* at 16:67 to 17:1-3.

II. JURISDICTION

The Court has subject matter jurisdiction under 28 U.S.C. § 1331.

III. LEGAL STANDARD

Summary judgment is proper when a "movant shows that there is no genuine dispute as to any material fact and the movant is entitled to judgment as a matter of law." Fed. R. Civ. P. 56(a). "A party asserting that a fact cannot be or is genuinely disputed must support the assertion by" citing to depositions, documents, affidavits, or other materials. Fed. R. Civ. P. 56(c)(1)(a). A party also may show that such materials "do not establish the absence or presence of a genuine dispute, or that an adverse party cannot produce admissible evidence to support the fact." Fed. R. Civ. P. 56(c)(1)(B). A dispute is genuine only if there is sufficient evidence for a reasonable trier of fact to resolve the issue in the nonmovant's favor, and a fact is material only if it might affect the outcome of the case. *Fresno Motors, LLC v. Mercedes Benz USA, LLC*, 771 F.3d 1119, 1125 (9th Cir. 2014) (citation omitted). "In considering a motion for summary judgment, the court may not weigh the evidence or make credibility determinations, and is required to draw all inferences in a light most favorable to the non-moving party." *Freeman v. Arpaio*, 125 F.3d 732, 735 (9th Cir. 1997).

Where the party moving for summary judgment would bear the burden of proof at trial, that party bears the initial burden of producing evidence that would entitle it to a directed verdict if uncontroverted at trial. *See C.A.R. Transp. Brokerage Co. v. Darden Rests., Inc.*, 213 F.3d 474, 480 (9th Cir. 2000). Where the party moving for summary judgment would not bear the burden of proof at trial, that party bears the initial burden of either producing evidence that negates an essential element of the non-moving party's claim, or showing that the non-moving party does not have enough evidence of an essential element to carry its ultimate burden of persuasion at trial. *Nissan Fire & Marine Ins. Co. v. Fritz Cos.*, 210 F.3d 1099, 1102 (9th Cir. 2000).

If the moving party satisfies its initial burden of production, then the non-moving party must produce admissible evidence to show that a genuine issue of material fact exists. *See id.* at 1102-03. The non-moving party must "identify with reasonable particularity the evidence that

precludes summary judgment." *Keenan v. Allan*, 91 F.3d 1275, 1279 (9th Cir. 1996). It is not the duty of the district court "to scour the record in search of a genuine issue of triable fact." *Id.* "A mere scintilla of evidence will not be sufficient to defeat a properly supported motion for summary judgment; rather, the non-moving party must introduce some significant probative evidence tending to support the complaint." *Summers v. Teichert & Son, Inc.*, 127 F.3d 1150, 1152 (9th Cir. 1997) (internal quotation marks and citation omitted). If the non-moving party fails to make this showing, the moving party is entitled to summary judgment. *Celotex Corp. v. Catrett*, 477 U.S. 317, 323 (1986).

IV. DISCUSSION

There are two motions for summary judgment pending. First, Defendants move for summary judgment as to all remaining asserted claims on the grounds that (1) the asserted claims are invalid under § 101 because they recite ineligible subject matter; and (2) there is no genuine issue of material fact as to whether the accused products practice each element of the asserted claims.

Second, Eolas moves for summary judgment as to several of Defendants' affirmative defenses, namely those based on (1) an alleged material failure by the PTO to comply with of 35 U.S.C. § 154(b) in determining the patent term adjustment for the patent-in-suit; (2) obviousness-type double patenting; (3) and other preclusion-related doctrines.

Also pending are several motions to exclude or strike certain expert testimony.

For the reasons set forth below, the Court concludes that the asserted claims are invalid under § 101 and it will grant summary judgment in Defendants' favor as to all claims on that basis. The Court will deny the remaining motions as moot.

A. Patentability under § 101

"Section 101 of the Patent Act defines the subject matter eligible for patent protection" by providing that "any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof" may be patented. *Alice Corp. Pty. Ltd. v. CLS Bank Int'l*, 573 U.S. 208, 216 (2014); 35 U.S.C. § 101. It is well-established that "abstract ideas are not patentable." *Alice*, 573 U.S. at 216 (internal quotation marks and citation omitted). However, "an

invention is not rendered ineligible for patent simply because it involves an abstract concept." *Id.* at 217. Courts must distinguish between patents that claim abstract ideas, on the one hand, and patents "that claim patent-eligible applications of those concepts," on the other hand. *Id.*

To draw this distinction, courts engage in a two-step analysis. At step one, courts determine whether the claims at issue are "directed to" an abstract idea. *Id.* Claims that are "directed to a specific improvement in computer functionality" or "to a specific implementation of a solution to a problem in the software arts" are not directed to an abstract idea. *Enfish, LLC v. Microsoft Corp.*, 822 F.3d 1327, 1338-39 (Fed. Cir. 2016). "In cases involving software innovations, this inquiry often turns on whether the claims focus on 'the specific asserted improvement in computer capabilities . . . or, instead, on a process that qualifies as an 'abstract idea' for which computers are invoked merely as a tool.'" *Finjan, Inc. v. Blue Coat Sys., Inc.*, 879 F.3d 1299, 1303 (Fed. Cir. 2018) (quoting *Enfish*, 822 F.3d at 1335-36). "The purely functional nature of [a] claim confirms that it is directed to an abstract idea, not to a concrete embodiment of that idea." *Affinity Labs of Texas, LLC v. Amazon.com Inc.*, 838 F.3d 1266, 1269 (Fed. Cir. 2016) ("*Affinity Labs II*"). Additionally, a claim that could be performed by a human, excising generic computer-implemented steps, is often abstract. *Intellectual Ventures I LLC v. Symantec Corp.*, 838 F.3d 1307, 1318 (Fed. Cir. 2016).

If the claims are directed to an abstract idea, courts proceed to step two and "consider the elements of each claim both individually and as an ordered combination" to determine "whether [the claim] contains an inventive concept sufficient to transform the claimed abstract idea into a patent-eligible application." *Alice*, 573 U.S. at 217 (internal quotation marks and citation omitted). "Stating an abstract idea while adding the words 'apply it' is not enough for patent eligibility. Nor is limiting the use of an abstract idea to a particular technological environment." *Id.* at 223 (internal quotation marks and citations omitted). Instead, this test "is satisfied when the claim limitations involve more than performance of well-understood, routine, and conventional activities previously known to the industry." *Berkheimer v. HP Inc.*, 881 F.3d 1360, 1367 (Fed. Cir. 2018) (internal quotation marks, alteration, and citation omitted). Both steps of the *Alice* inquiry are informed by "the claims in light of the written description." *Amdocs (Israel) Ltd. v.*

Openet Telecom, Inc., 841 F.3d 1288, 1299 (Fed. Cir. 2016).

"Whether a claim recites patent eligible subject matter is a question of law which may contain disputes over underlying facts." *Berkheimer*, 881 F.3d at 1368. But this does not mean that patent eligibility cannot be decided on a motion for summary judgment, as "not every § 101 determination contains genuine disputes over the underlying facts material to the § 101 inquiry." *Id.*

1. *Alice* step one

At step one of the *Alice* framework, courts "look at the focus of the claimed advance over the prior art to determine if the claim's character as a whole is directed to excluded subject matter." *Affinity Labs of Tex., LLC v. DIRECTV, LLC*, 838 F.3d 1253, 1257 (Fed. Cir. 2016) ("*Affinity Labs I*") (internal quotation marks omitted). A claim is directed to a solution to a computer-functionality problem and is, therefore, not directed to an abstract idea, when it has "the specificity required to transform a claim from one claiming only a result to one claiming a way of achieving it." *SAP America, Inc. v. InvestPic, LLC*, 898 F.3d 1161, 1167 (Fed. Cir. 2018). On the other hand, where a claim is written in functional terms without claiming a specific way of achieving the functions, then the claim is directed to an abstract idea. *Affinity Labs II*, 838 F.3d at 1269 ("The purely functional nature of [a] claim confirms that it is directed to an abstract idea, not to a concrete embodiment of that idea."). "*Alice* step one presents a legal question that can be answered based on the intrinsic evidence." *CardioNet, LLC v. InfoBionic, Inc*, 955 F.3d 1358, 1372 (Fed. Cir. 2020), *cert. denied sub nom. InfoBionic, Inc. v. Cardionet, LLC*, 141 S. Ct. 1266 (2021). The claim language is the most important indicator of the focus of the claims. *See Chamberlain Grp., Inc. v. Techtronic Indus. Co.*, 935 F.3d 1341, 1346 (Fed. Cir. 2019) ("[W]hile the specification may help illuminate the true focus of a claim, when analyzing patent eligibility, reliance on the specification must always yield to the claim language in identifying that focus.") (citation and internal quotation marks omitted).

Defendants argue that the asserted claims are directed to the abstract idea of providing interactive applications on the web using distributed computing. Eolas, on the other hand, argues that the asserted claims are directed to technological improvements, which vary for each asserted

claim or groups of asserted claims. In general, Eolas contends that the asserted claims are directed to "specific improvements in areas of security, scalability, and more." *See* ECF No. 840-3 at 14.

For the reasons set forth below, the Court finds that the asserted claims are directed to the abstract idea of enabling interactivity with remote objects on a client computer browser using distributed computing. The Court analyzes the asserted claims at step one based on the grouping of claims that Eolas employed in its opposition.

a. Claim 32

Claim 32 recites the following method:

> 32. A method, performed by a server computer connected to the World Wide Web distributed hypermedia network on the Internet, for disseminating interactive content via the World Wide Web distributed hypermedia network on the Internet, the method comprising:
>
> A. receiving, by the server computer, a request for information; and
>
> B. transferring, by the server computer, the information onto the World Wide Web distributed hypermedia network on the Internet, wherein:
>
> (i) a World Wide Web browser on a client computer connected to the World Wide Web distributed hypermedia network has been configured with a plurality of different interactive-content applications, each said interactive-content application being configured to enable a user to interact, within one or more World Wide Web pages, with at least part of one or more objects while at least part of each of said one or more objects is displayed to the user within at least one of said one or more World Wide Web pages, and
>
> (ii) at least part of the information is configured to allow the World Wide Web browser on the client computer to:
>
> a. detect at least part of an object to be displayed in a World Wide Web page, and
>
> b. cause a display of the World Wide Web page to a user,
>
> (iii) the World Wide Web browser has been configured to:
>
> A. select an interactive-content application,

based upon the information, from among the different interactive-content applications, and

B. automatically invoke the selected interactive-content application to enable the user to employ the selected interactive-content application to interact within the World Wide Web page with at least part of the object while at least part of the object is displayed to the user within the World Wide Web page, wherein the automatically invoked interactive-content application has been configured to operate as part of a distributed application configured to enable a user to perform the interaction through the use of communications sent to and received from at least a portion of the distributed application located on two or more distributed application computers connected to the World Wide Web distributed hypermedia network on the Internet, the two or more distributed application computers being remote from the client computer.

The focus of Claim 32 is enabling interactivity with remote objects on a client computer browser using distributed computing. The enabling of the interactivity is achieved by an "interactive-content application" (which, as construed, means "application that enables a user to interact with content," ECF No. 212 at 13), invoked by the client computer's browser, that operates as part of a "distributed application" (which, as construed, means "an application that is broken up and performed among two or more computers," *id.* at 16) located at least in part on remote computers. The claim language provides that the web browser selects and automatically invokes the "interactive-content application" from among a plurality of interactive-content applications based on the information it receives. The claim requires that the "interactive-content application" be "configured" to enable the user of the client computer to interact with the object within a web page and to operate as part of a "distributed application" located at least in part on two or more remote computers connected to the internet. The claim further requires that the "distributed application," in turn, be "configured" to enable the user of the client computer to perform the interaction through communications sent to and received from at least a portion of the distributed application located on two or more remote computers.

The claim language does not specify *how* to "configure" the interactive-content application and the distributed application to render them capable of enabling the interactivity on the client computer browser. Claim 32 requires that the distributed application, and the interactive-content application selected by the browser, be "configured" so as to allow the client computer browser and remote computers to communicate in order to make the interactivity on the client computer browser possible. Claim 32 does not contain limitations regarding *how* the client computer and the remote computers *should* communicate to ensure that the problems discussed in the specification, namely computing limitations of client computers and bandwidth constraints, are overcome in the manner described in the specification, which is by having the remote computers perform computations that are resource-intensive and sending back to the client computer only a limited amount of data, such as only the results of such computations. The claim language of Claim 32 does not require that the computing work or data required to enable the interactivity on the client computer browser be distributed in *any* particular way among the remote computers relative to the client computer, much less in a way that would circumvent the problems discussed in the specification regarding the limited computing power of client computers and bandwidth constraints.

Claim 32, therefore, requires only *results* (that interactivity on the client computer browser be enabled via distributed computing), without specifying *how* to achieve them.[3] Where, as here, a claim's terms "as properly construed simply demand[] the production of a desired result . . . without any limitation on how to produce that result," the claim "in effect encompasses all solutions" and, therefore, "encompasses a patent-ineligible abstract concept rather than an arguably technical improvement[.]" *See Interval Licensing LLC v. AOL, Inc.*, 896 F.3d 1335, 1345 (Fed. Cir. 2018) (holding that the asserted claim is directed to an abstract concept rather than a technical improvement because the "attention manager" that purportedly provided the technical

[3] Eolas contends that "the construction for the term 'distributed application' describes exactly how the interactive application is configured to use distributed processing—the 'distributed application' is an 'application that is broken up and performed among two or more computers.'" ECF No. 840-3 at 33. The Court disagrees for the reasons discussed above.

improvement, "as properly construed," "simply demand[ed] the production of a desired result . . . without any limitation on how to produce that result"); *see also Apple, Inc. v. Ameranth, Inc.*, 842 F.3d 1229, 1240-41 (Fed. Cir. 2016) (holding that the asserted claims are directed to an abstract idea because they "claim systems including menus with particular features" and "do not claim a particular way of programming or designing the software to create menus that have these features, but instead merely claim the resulting systems"); *Affinity Labs I*, 838 F.3d at 1269 ("At that level of generality, the claims do no more than describe a desired function or outcome, without providing any limiting detail that confines the claim to a particular solution to an identified problem. The purely functional nature of the claim confirms that it is directed to an abstract idea, not to a concrete embodiment of that idea."); *Aftechmobile Inc. v. Salesforce.com, Inc.*, No. 19-cv-05903-JST, 2020 WL 6129139, at *6 (N.D. Cal. Sept. 2, 2020) (holding that asserted claims were directed to an abstract concept because they failed to specify "how to achieve" the functions that are the inventive concept stated in the specification), *aff'd*, 853 F. App'x 669 (Fed. Cir. 2021).

That Claim 32 requires generic computer components (e.g., "server," "client computer," "remote computers") or the internet does not alter the analysis at step one, because such limitations merely provide a generic environment in which to carry out the abstract idea. *See, e.g., In re TLI Commc'ns LLC Patent Litig.*, 823 F.3d 607, 612 (Fed. Cir. 2016) (noting that an asserted claim is directed to an abstract idea where the additional recited components "merely provide a generic environment in which to carry out the abstract idea"); *Alice*, 573 U.S. at 222 ("[T]he prohibition against patenting abstract ideas cannot be circumvented by attempting to limit the use of [the idea] to a particular technological environment.") (citation and internal quotation marks omitted) (alteration in original).

In light of these authorities, the Court finds that Claim 32 is directed to the abstract concept of enabling interactivity with remote objects on a client computer browser using distributed computing.

The specification supports the Court's interpretation of Claim 32 as being directed to that abstract concept. The specification distinguishes between the prior art and the claimed invention by noting that the prior art allowed users of client computers to locate and retrieve data objects

from other computers on the internet while allowing users "very little, if any, interaction with these data objects" as a result of bandwidth constraints and computer processing limitations in client computers. *Id.* at 6:25-34. The claimed invention, by contrast, allows users of client computers to interact with remote objects on the internet, even large objects, *notwithstanding* the computing limitations of client computers or bandwidth constraints. '507 patent at 15:65-68 ("The present invention allows a user to have interactive control over application objects such as three dimensional image objects and video objects."). As noted, the specification does not state that the claimed invention improves the computing capacity of client computers or improves the availability of bandwidth on the internet. The specification implies the possibility that the computing capacity of client computers and bandwidth constraints remain unchanged despite the claimed invention.

The mechanism that the specification describes for enabling client computers' interactivity with remote objects is *distributing the computing* required for the interactivity among remote computers relative to the client computer. *See, e.g.*, *id.* at 7:1-35 (discussing "parallel distributed processing" of tasks among remote computers to enable a user of a client computer browser to view and interact with large images, where the images are "processed in a distributed manner by several computers" and where the "calculations may be performed by remote distributed computer systems"). The examples in the specification for how to distribute the computing in a way that circumvents client computers' limitations and bandwidth constraints involve arrangements where remote computers perform resource-intensive computations and send back to the client computer only a relatively small amount of data, such as the results of the computations. *See id.* at 11:26-38 (describing "example" of application of claimed invention wherein remote computers perform calculations for a spreadsheet program and only the calculations' results are sent to the client computer for display, noting that, "[i]n this way, computer systems located remotely on the network can be used to provide the computing power that may be required for certain tasks and to reduce the data bandwidth required by only transmitting results of the computations"); *id.* at 7:15-23 (discussing distributed processing where remote computers perform tasks such as volume rendering or three-dimensional image transformation to enable interactions with large images on a

client computer and then transmit to the client computer only the data that is necessary to "update the image" on the client computer).

These descriptions in the specification, because they are not captured in Claim 32 (or any of the asserted claims), are insufficient to take Claim 32 (or any of the asserted claims) outside of the realm of abstraction. *See Koninklijke KPN N.V. v. Gemalto M2M GmbH*, 942 F.3d 1143, 1150 (Fed. Cir. 2019) (holding that, for a claim to be directed to a technological improvement as opposed to an abstract idea, "*the claims* must recite a specific means or method that solves a problem in an existing technological process") (emphasis added); *see also Yu v. Apple Inc.*, 1 F. 4th 1040, 1044-45 (Fed. Cir. 2021) (holding that the "mismatch between specification" details "and the breadth" of the claim "underscores that the focus of the claimed advance is the abstract idea"); *Accenture Glob. Servs., GmbH v. Guidewire Software, Inc.*, 728 F.3d 1336, 1345 (Fed. Cir. 2013) ("[T]he complexity of the implementing software or the level of detail in the specification does not transform a claim reciting only an abstract concept into a patent-eligible system or method.").

The breadth of the claim language in Claim 32, which is not restricted to any specific way of enabling the interactivity on the client computer browser using distributed computing, raises preemption issues. Preemption is the "concern that drives" the principle of excluding abstract ideas from patent-eligible subject matter. *See Alice*, 573 U.S. at 216. Here, the claim language does not limit the claimed method to covering a technological solution to the problems discussed in the specification, because the claim language does not require that the computing work required to enable interactivity on the client computer browser be distributed in any particular way. Indeed, Claim 32 does not require, for example, that more computing work be done on the remote computers relative to the client computer, or that the most resource-intensive tasks be performed by the remote computers instead of the client computer, even though those types of arrangements would serve as workarounds to the client computer's limitations according to the specification. Claim 32, therefore, covers implementations that would *not* solve the problems discussed in the specification and, as such, its scope goes beyond a specific solution to a technological problem. The overbroad preemptive potential of Claim 32 further supports a finding that Claim 32 is

directed to an abstract idea. *See Symantec*, 838 F.3d at 1321 (holding that "preemption may signal patent ineligible subject matter").

Claim 32 is analogous the one held to be ineligible under § 101 in *Device Enhancement LLC. v. Amazon.com, Inc.*, 189 F. Supp. 3d 392, 403 (D. Del. 2016), which Defendants cited in their opening brief. There, the claim at issue recited a method that the patentee argued was directed to "a solution to the computer-specific problem of delivering multimedia content to a variety of devices with limited resources and different capabilities." *Id.* The claim required that tasks between a "client-side application" on the terminal device and a "remote application" on the server be "dynamically split[]" according to "predetermined computational resources and inherent capabilities." *Id.* The claim further required communications over a network between the server and the terminal device to exchange data, deliver the content, and exchange messages. *Id.*

The court held that the claimed method was directed to the idea of "using distributed architecture to increase the capabilities of individual devices by using remote resources," because it

> generally provides for the installation of a generic client-side application on the terminal device and the installation of a corresponding remote application on the server (which handles most of the graphical processing). The server exchanges data with the terminal device. *Tasks are split between the client-side application and the remote application, albeit without further guidance from the patent.* The processed content is then transmitted and the client-side application renders the content and responds to messages.

Id. at 404-05 (emphasis added).

Notwithstanding the patentee's argument that the claim at issue was directed to solving a "computer-specific problem," the court held that the claim was ineligible under § 101 because it "preempts virtually all possible ways of performing" the idea of "using distributed architecture to increase the capabilities of individual devices by using remote resources," as "the patented method uses computerized devices (of any type) in conventional ways (installation of applications, data exchange, and data processing) without delineating any particular way of putting the ideas into practice." *Id.* at 405. The court further held that "the very steps of the method comprise nothing more specific than the underlying idea itself[.]" *Id.*

Claim 32 here is similar to the claim in *Device Enhancement*, as it requires the use of distributed computing to enable interactivity with remote objects on client computer browsers. As with the claim in *Device Enhancement*, the claim here requires applications on the client computer and remote computers, whose configurations are not specified in the patent, as well as communications between the computers via a network. As with the claim in *Device Enhancement*, the claim here does not specify "any particular way" of dividing the computing work between the client computer and remote computers to achieve the purported solution of the patent. As with the claim in *Device Enhancement*, the preemptive potential of Claim 32 is overbroad, for the reasons discussed above. *Device Enhancement*, therefore, supports the Court's finding that Claim 32 is directed to an abstract idea.

Defendants have pointed to other cases in which courts reached similar conclusions when faced with claims that required computers on a network to work together to accomplish computing tasks. For example, in *Appistry, Inc. v. Amazon.com, Inc.*, the claims covered systems and methods for processing information via networked computers in a distributed manner. 95 F. Supp. 3d 1176, 1178 (W.D. Wash. 2016), *aff'd sub nom. Appistry, LLC v. Amazon.com, Inc.*, 676 F. App'x 1008 (Fed. Cir. 2017). The claims required using "a request handler, a plurality of process handlers, and a plurality of task handlers" to perform the distributed processing. *Id.* The patentee argued that the claimed method was directed to a technological improvement, namely "a more efficiently and reliably distributed configuration of multiple computers . . . resulting in better performance." *Id.* at 1180. The court disagreed, holding that the claims were directed to "the abstract idea of distributed processing akin to the military's command and control system," as they required merely "distributing tasks through a hierarchical structure." *Id.* at 1179-80. In *Coho Licensing LLC v. Glam Media, Inc.*, No. C 14-01576 JSW, 2017 WL 6210882 (N.D. Cal. Jan. 23, 2017) *aff'd,* 710 F. App'x 892 (Fed. Cir. 2018), the court reached a similar conclusion when analyzing the patent-eligibility of claims that required "allocating," "sub-allocating," and "dividing" tasks among multiple computers, finding that the claims were directed to the abstract concept of "dividing and subdividing tasks for distributed processing."

Eolas' only response to *Device Enhancement*, *Appistry*, and *Coho Licensing* is that "none

of those cases controls the outcome in this case, which involves its own particular claims, specification and invention." ECF No. 840-3 at 35. While the cases are not controlling, the Court finds them to be apt and instructive. It also finds, in the absence of any meaningful argument to the contrary, that they lend support to the Court's conclusion that Claim 32 is directed to an abstract idea. *See Amdocs*, 841 F.3d at 1294 (noting that, in light of the absence of a "single, succinct usable definition or test" with respect to what an abstract idea "encompasses" under § 101, courts can and do "examine earlier cases in which a similar or parallel descriptive nature can be seen" when determining patent-eligibility).

Eolas' arguments that Claim 32 is not directed to an abstract idea are unpersuasive. Eolas contends that Claim 32 is directed to improvements in computer technology, namely "securely providing interactive content over the World Wide Web to client computers having limited computing capabilities." ECF No. 840-3 at 25-26. Eolas contends that the invention overcame "problems that existed in October 1994 with the World Wide Web open distributed hypermedia system, including: (1) limitations in the computing power of end users' computers ('507 Patent at 5:50-52); and (2) security, i.e., preventing the end user's computer from losing control and simply running whatever application was requested by a hacker." *Id.*

To be eligible at step one, "the claims must recite a specific means or method that solves a problem in an existing technological process." *Koninklijke*, 942 F.3d at 1150 (emphasis added). In other words, the asserted improvement must be recited in the claims *and* it must be recited with sufficient specificity such that it is not abstract. That is not the case here.

As to the first problem of limited computing power in client computers, Eolas argues that the claimed invention "overcame" it "through distributed applications, where portions of the application are run on the client computer and one or more server computers." ECF No. 840-3 at 27. Eolas contends that this solution is reflected in the language of Claim 32, because that claim requires

> that the interactive-content application (selected by the "World Wide Web browser" "based upon the [transmitted] information") "has been configured to operate as part of a distributed application configured to enable a user to perform the interaction through the use of *communications sent to and received from at least a portion*

> *of the distributed application located on two or more distributed application computers* connected to the World Wide Web.

ECF No. 840-3 at 26 (citing '507 patent at 23:61-67) (emphasis in the original). Eolas also contends that the specification "confirms that these distributed application aspects of claim 32 provide a technological solution to the technological problem," ECF No. 840-3 at 26, because "the specification identifies the technological problem when attempting to view large data objects over the Internet caused by the technological limitations of the Web browsers, viewers, and end user computers in use at the time." *Id.* (citing '507 patent at 5:36-52). Eolas argues that Figures 6 and 10 of the '507 patent "illustrate" the distributed application aspects of Claim 32 that are the purported solution.

Eolas is correct that the specification discusses the limitations of client computers' processing power as a hindrance in the context of interacting with remote objects, as well as distributed computing as being a workaround to that problem because it permits resource-intensive tasks required to enable interactivity on the client computer to be performed by more powerful remote computers on the network. However, as discussed above, Claim 32 does not claim any particular way of distributing the computing necessary to enable the interactivity on the client computer browser. Claim 32 also says nothing how much data should be sent to the client computer and when. The limitations of Claim 32 to which Eolas points merely require that the "interactive-content application" and "distributed application" be configured in a way that enables communications between the client computer and remote computers so as to enable the interactivity on the client computer browser. Requiring that these communications be enabled is not the same thing as requiring that computing work be offloaded from the client computer in a manner that would circumvent its limitations. Eolas has not shown that enabling communications between the client computer and the remote computers alone, without any requirements for how to distribute the computing work among the computers, would overcome the computing limitations of the client computer.

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Eolas points to Figures 6[4] and 10[5] for the proposition that they teach how to perform the distributed computing that circumvents the computing limitations in client computers. The Court is not persuaded. These figures describe in general terms how the client computer and remote computers could be structured to enable interactivity on the client computer, but they do not teach specifically how to distribute the computing work required to enable interactivity on the client computer, or how to coordinate such computing work, in a manner that would circumvent the client computer's computing limitations. Further, none of the specification's descriptions of these figures are incorporated into the claims. The specification makes clear that the scope of the claims must not be interpreted as being restricted by the figures and drawings described in the specification; it states that "[t]he specification and drawings are . . . to be regarded in an illustrative rather than a restrictive sense, the invention being limited only by the provided claims." *Id.* at 16:67 to 17:1-3. Accordingly, the descriptions of these figures are incapable of saving Claim 32 from patent-ineligibility at step one.

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[4] Figure 6 is "an embodiment of the present invention," '507 patent at 11:3-24, that illustrates computers connected via network, wherein remote computers that are not the client computer or the server contain an "Application (Distributed)" that allows tasks to be performed among two or more such computers and the coordination of the distributed processing can be performed at any of the computers. While the specification's description of Figure 6 states that, in a "preferred embodiment," "distributed processing is coordinated by a program called 'VIS' represented by application client 210 in FIG. 6," *id.* at 11:23-24, nothing in the '507 patent describes how to write or configure "VIS" or indicates how "VIS" would coordinate the processing. The specification states that "VIS" is "software presently under development" created "as part of the Doyle Group's distributed hypermedia object embedding approach" described in an external publication. *See id.* at 10:5-14. Nothing in Figure 6 describes how to distribute the computing work or processing required to enable interactivity on the client computer browser, or how to coordinate such processing, in a way that would ensure that the computing limitations of the client computer are circumvented.

[5] Figure 10 illustrates generally how communications between the browser on the client computer and various "processes" whose configurations are not described in the patent can structured to enable the presentation of images on a client computer browser. '507 patent at 16:37-54. Eolas points to Figure 10 for the proposition that this figure shows how a user's browser "presents three-dimensional image data with the help of remote 'VRServers' and coordination by 'VIS.'" ECF No. 840-3 at 27. Nothing in this figure describes how to configure or write or otherwise achieve the purported functions of the "processes" "VIS" and "VRServer." The specification states that "VIS" and "VRServer" are software under development whose details are described in an external publication. *See id.* 10:5-14; 10:28-29. Accordingly, the references to "VRServers" and "VIS" in Figure 10 do not teach how to distribute the processing required to enable interactivity on the client computer, or how to coordinate such processing, in a manner that would ensure that the computing limitations of the client computer are circumvented.

As to the second problem that Eolas contends was solved by the claimed invention, namely that of "security" by "preventing the end user's computer from losing control and simply running whatever application was requested by a hacker," ECF No. 840-3 at 25-26, Eolas contends that Claim 32 describes how to solve it. Eolas points to the limitations in Claim 32 that require that "*only* interactive-content applications with which a Web browser has previously been configured can be utilized" as embodying the purported solution to the security problem; the limitations to which Eolas points require that the web browser on the client computer be "*configured with a plurality of different interactive-content applications*" and that the web browser select an interactive-content application from "among the different interactive-content applications" with which it was configured. *Id.* at 28 (emphasis in the original).

However, the Court finds no indication in the intrinsic evidence that the claimed invention was intended to solve *any* security vulnerabilities. The "analysis at *Alice* step one involves examining the patent claims in view of the plain claim language, statements in the written description, and the prosecution history,[6] if relevant." *CardioNet*, 955 F.3d at 1374. Here, Eolas points to no portion of the claims or the specification where the notion of preventing hackers from gaining control over a client computer is discussed. Neither Claim 32 nor any of the other asserted claims contain limitations restricting the types of applications that can be selected by the browser to applications that are secure or that otherwise would not render the client computer susceptible to hacking. The claim language merely requires that the browser be "configured with a plurality of different interactive-content applications" from which the browser will select one such application; the claim language does not restrict the applications that the browser can select to only those applications that are secure or that otherwise would not allow a hacker to hack the client computer. The specification likewise does not discuss hacking vulnerabilities or any other security issues. Indeed, the words "security" or "secure" are not mentioned in the '507 patent.

[6] Because Eolas points to no portion of the prosecution history that would support a finding that the asserted claims were intended to provide a solution to security vulnerabilities in client computers, *see* ECF No. 840-3 at 28-30 (portion of Eolas' opposition discussing purported solution to security vulnerabilities), the Court finds that the prosecution history is not relevant to the determination of this issue.

Eolas points to Figure 8A in the specification to argue that this Figure "illustrates" Claim 32's purported solution of "securing the browser against running dangerous applications." ECF No. 840-3 at 28. The Court disagrees. Figure 8A depicts a browser that checks the "type attribute" of an object to be displayed on the client computer to determine whether the object is an "application object" ("e.g., a three dimensional image object"), in which case the browser will launch a "predetermined application," or whether the object is a "video object," in which case the browser will launch a "video player application." '507 patent at 15:15-18; 45-50. Nothing in the specification's description of Figure 8A suggests that the browser's checking of the "type attribute" is intended to, or would result in, restricting the types of applications that could be selected by the browser to only applications that are secure or that would not render the client computer susceptible to hacking. Instead, the specification suggests that the checking of the "type attribute" is intended to ensure that the application selected matches the type of the object to be displayed (e.g., video vs. three-dimensional image, etc.). *See id.* at 13:30-33 (stating that TYPE values are "useful . . . where the browser client needs to determine which application to launch based on the data format"). Accordingly, the Court cannot conclude, based on Figure 8A, that the claimed invention was intended to solve hacking vulnerabilities.[7]

The absence of any indication in the claim language and the specification that the asserted claims were intended to solve security vulnerabilities distinguishes this case from those that Eolas cites in its opposition. In each case upon which Eolas relies, *see* ECF No. 840-3 at 28-30, the technological solution to which the claims at issue were directed *was discussed in the specification*, as well as recited in the claims in non-abstract terms and with the requisite degree of

[7] Even if it were the case that Figure 8A's description of a web browser launching a "predetermined application" were consistent with an improvement to the security of a client computer, that still would not render Claim 32 (or any of the other asserted claims) patent-eligible at step one, because embodiments were excluded from the asserted claims at claim construction. *See* ECF No. 212 at 21 ("Although the specification refers to launching a 'predetermined application' (id. at 15:17–18), this predetermination is a specific feature of a particular disclosed embodiment that should not be imported into the claims."). As discussed above, to be patent-eligible at step one, *the asserted claims* must recite the technological improvement with specificity.

specificity.[8] Eolas cites no case in which a court has held that a claim was directed to a solution to a problem that was not discussed in the specification, and the Court declines to do so here. Further, relying on a solution to a problem that was not disclosed in the patent would essentially reward Eolas' failure to disclose that purported solution in the patent, which would be inconsistent with the underlying goal of the patent system, which is to award patent rights only to those who create and publicly disclose "useful advances in technology." *See Pfaff v. Wells Elecs., Inc.*, 525 U.S. 55, 63 (1998) ("[T]he patent system represents a carefully crafted bargain that encourages both the creation and the public disclosure of new and useful advances in technology, in return for an exclusive monopoly for a limited period of time.").

Eolas also points to extrinsic evidence that was generated in the course of litigation to argue that Claim 32 is directed to solve the problem of hacking vulnerabilities. Specifically, Eolas points to an April 2020 declaration of Dr. David M. Martin, Jr., Eolas' expert, which Eolas filed in support of its opposition to Defendants' summary judgment motion on obviousness-type double patenting. *See* Martin Decl. ¶¶ 44-48, ECF No. 609-1. It also points to an April 2020 declaration of Michael Doyle, Ph.D., a co-inventor of the '507 patent, which Eolas filed in support of its opposition to Defendants' summary judgment motion on obviousness-type double patenting,

[8] *See Koninklijke*, 942 F.3d at 1151 (holding that asserted claims were not directed to abstract concept because "they recite a sufficiently specific implementation (i.e., modifying the permutation applied to the original data 'in time') of an existing tool (i.e., check data generating device) that improves the functioning of the overall technological process of detecting systematic errors in data transmissions," where "the specification makes clear that modifying the permutation in time provides the technological benefit of preventing non-detection of repetitive errors"); *Finjan*, 879 F.3d at 1304 (holding that claims were directed to a non-abstract improvement in computer functionality because they recited "specific steps" for generating a "behavior-based" security profile to be used in virus scanning, where the "'behavior-based' approach to virus scanning was pioneered by Finjan [the patentee] and is disclosed in the '844 patent's specification"); *SRI Int'l, Inc. v. Cisco Sys., Inc.*, 930 F.3d 1295, 1303 (Fed. Cir. 2019) (holding that "claims are directed to using a specific technique—using a plurality of network monitors that each analyze specific types of data on the network and integrating reports from the monitors—to solve [the] technological problem" of "identifying hackers or potential intruders into the network," where the specification "explains that the claimed invention is directed to solving" networks' vulnerabilities to hacker attacks); *Ancora Techs., Inc. v. HTC Am., Inc.*, 908 F.3d 1343, 1348, 1345 (Fed. Cir. 2018), *as amended* (Nov. 20, 2018) (holding that asserted claims were directed to "a non-abstract computer-functionality improvement" to methods to prevent hacking of license-authorization software that involved specifically requiring the use of a modifiable part of the BIOS memory to store information, where the specification stated that "[u]sing BIOS memory, rather than other memory in the computer, improves computer security").

Doyle Decl. ¶¶ 13-14, ECF No. 609-14, and to Mr. Doyle's February 2012 trial testimony in *Eolas Technologies v. Adobe Systems, Inc.*, No. 6:09-cv-00446-LED (E.D. Tex.) ("*Eolas I*"), Doyle Trial Tr. at 101-02, ECF No. 842-4 at 16-17, in which Eolas asserted claims against multiple defendants for infringement of U.S. Patent No. 5,838,906 and U.S. Patent No. 7,599,985; the '507 patent stems from a continuation application of these patents. The portions of the declarations cited state that claim limitations in the '507 patent requiring that the browser be configured with a plurality of interactive-content applications from which it selects and invokes one such application distinguishes the '507 patent from the prior art, and that prior methods of configuring browsers were insecure. *See* Martin Decl. ¶¶ 44-48, ECF No. 609-1; Doyle Decl. ¶¶ 13-14, ECF No. 609-14. The trial testimony cited states that the claimed invention in the '906 and '985 patents was intended in part to prevent hackers from taking control over a computer. *See* Doyle Trial Tr. at 101-02, ECF No. 842-4 at 16-17.

The Court is not required to consider extrinsic evidence when conducting the step one analysis, because "*Alice* step one presents a legal question that can be answered based on the intrinsic evidence." *CardioNet*, 955 F.3d at 1372 ("The analysis [at step one] does not require a review of the prior art or facts outside of the intrinsic record regarding the state of the art at the time of the invention."). As discussed above, the claim language and specification do not support a finding that Claim 32 (or any of the asserted claims) are directed to a technological solution to security vulnerabilities in client computers. That is sufficient for the Court to conclude, under *CardioNet*, that Claim 32 (and the other asserted claims) are not directed to that purported solution. The extrinsic evidence to which Eolas points, to the extent that it purports to show that the asserted claims are directed to a solution to security vulnerabilities in client computers, is inconsistent with the claim language and specification. Because Eolas has cited no authority in which a court relied on extrinsic evidence to find that the focus of the asserted claims at step one was a solution to a problem that was not discussed in the patent itself, the Court declines to do so here, particularly given that the extrinsic evidence at issue was generated in the context of litigation. Crediting the extrinsic evidence in question notwithstanding its mismatch with the claim language and specification would result in prioritizing extrinsic evidence over intrinsic

evidence when conducting the step one analysis, which would be contrary to established Federal Circuit law requiring that the step one inquiry be guided by the intrinsic evidence and, above all, the claim language. *See CardioNet, LLC*, 955 F.3d at 1372; *see also ChargePoint*, 920 F.3d at 769 ("[A]ny reliance on the specification in the § 101 analysis must always yield to the claim language. Ultimately, '[t]he § 101 inquiry must focus on the language of the Asserted Claims themselves[.]'") (citation omitted). Eolas' own arguments support the Court's conclusion that it should decline to rely on the extrinsic evidence in question in conducting the step one inquiry. *See* ECF No. 840-3 at 24 (arguing that "[t]he determination of whether claims are directed to an abstract idea is an issue of law, and courts limit their examination to the claim language, the specification, and the prosecution history.").

In light of the foregoing, the Court finds that Claim 32 is directed to the abstract idea of enabling interactivity with remote objects on a client computer browser using distributed computing. Claim 32, therefore, is not patent-eligible at step one.

b. Claims 37 and 39

Claims 37 and 39 depend from Claim 32. Claim 37 adds limitations to Claim 32, namely that "at least one or more coordination computers performs coordination of at least part of the distributed application to perform at least one task." '507 Patent at 24:24-26. The terms "at least one or more coordination computers performs coordination" were construed as "at least one or more computers manage multiple computers so as to work together." ECF No. 212 at 28. Claim 39 adds limitations to Claim 32 and 37, namely that "two or more of the distributed application computers work together to perform the at least one task" that is broken up. '507 patent at 24:27-32.

Eolas argues Claims 37 and 39 are not directed to an abstract idea and are, instead, directed to solutions to "an additional technological problem," namely "scalability and resource management, especially where end users have resource-limited computers." ECF No. 840-3 at 30. Eolas further contends that it is the "'coordination computer' feature required by claims 37 and 39 that describes how the scalability and resource management improvements are achieved, which is also described the specification at 11:9-22 (referring to Figure 6) and 16:37-55 (Figure 10)." *Id.* at

31. Eolas also cites the April 2020 declaration of Dr. David Martin, Eolas' expert, for the proposition that Claims 37 and 39 are directed to solving problems in scalability and resource management. *See* Martin Decl. ¶¶ 59-66, ECF No. 609-1.

The Court is not persuaded that Claims 37 and 39 are directed to a solution to problems in scalability and resource management. Eolas points to no portion of the specification that discusses problems in scalability and resource management that the claimed invention was intended to solve. The portions of the specification that Eolas cites, which describe Figures 6 and 10, do not discuss problems with scalability and resource management or solutions to the same. As discussed above, Figures 6 and 10 describe, in general terms, and without reference to scalability and resource management problems or solutions, how distributed computing *could be* structured to enable interactivity on a client computer browser, but they do not specify how to distribute the computing required to enable such interactivity or how any such distribution should be coordinated. Even if it were the case that the specification's description of Figures 6 and 10 shed any light on how the "coordination" in claims 37 and 39 could be performed, however, that would not help Eolas, because the specification's description of these figures is not incorporated in the claim language. *See* '507 patent 16:67 to 17:1-3 ("The specification and drawings are . . . to be regarded in an illustrative rather than a restrictive sense, the invention being limited only by the provided claims.").

In addition to citing Figures 6 and 10, Eolas also cites the April 2020 declaration of Dr. David Martin, which Eolas filed in support of its opposition to Defendants' summary judgment motion on obviousness-type double patenting, for the proposition that Claims 37 and 39 are directed to solving problems in scalability and resource management. *See* Martin Decl. ¶¶ 59-66, ECF No. 609-1. The portions of Dr. Martin's declaration to which Eolas points state that the claims of the '507 patent are distinguishable from the claims of earlier, related patents because of the '507 patent's inclusion of limitations requiring coordination. *See id.* The cited portions of the declaration do not state that the coordination limitations to which Eolas points were intended to solve problems of scalability and resource management, or any other problem.

As discussed above, the Court need not consider extrinsic evidence when conducting the

step one determination, even if relevant. *See CardioNet, LLC*, 955 F.3d at 1372. Here, the cited portions of Dr. Martin's declaration do not appear to be relevant to Eolas' contention that Claims 37 and 39 were intended to solve issues of scalability and resource management. But even if this extrinsic evidence *were* relevant and supported Eolas' contention that Claims 37 and 39 are directed to a solution to scalability and resource management problems, the Court would decline to rely on it to find that the claims at issue are directed to that solution. Eolas has cited no case in which a court relied on extrinsic evidence to find that the focus of the asserted claims at step one was a solution to a problem that was not discussed in the patent itself. As discussed above in the context of Claim 32, relying on extrinsic evidence that is at odds with the claim language and specification when determining the focus of the claims would result in prioritizing extrinsic evidence over intrinsic evidence when conducting the step one analysis, which would be contrary to established law. *See CardioNet, LLC*, 955 F.3d at 1372; *see also Amdocs*, 841 F.3d at 1299.

Accordingly, the Court cannot find that Claims 37 and 39 are directed to solutions to scalability and resource management problems.

To the extent that Eolas contends that the coordination limitations in Claims 37 and 39 embody solutions to the problems that *are* discussed in specification, namely computing limitations in client computers and bandwidth constraints, that argument also fails. The solution to these problems, as described in the specification, is distributing the computing necessary to enable interactivity on the client computer browser. As discussed in detail above, the limitations that Claims 37 and 39 share with Claim 32 do not describe how to distribute the computing in any particular way, much less in the way that would ensure that the computing limitations of client computers and bandwidth constraints are circumvented. The "coordination" limitations that Claims 37 and 39 add to Claim 32 do not supply the missing information. While they require that at least one computer manage other computers to perform at least one task and that at least two distributed computers work together to perform at least one task, they do not specify how to distribute the computing work required to enable the interactivity in a way that would circumvent the limited computing power of client computers and bandwidth constraints, nor do they specify how that distribution should be coordinated. As noted, the specification discusses examples where

remote computers relieved the client computer of computational burdens by performing resource-intensive computations and by sending back to the client computer only a limited amount of data, such as the results of such computations. The limitations in Claims 37 and 39 that "at least one task" be performed by remote computers working together do not require that resource-intensive tasks, or that a significant portion of the tasks, are performed by remote computers as opposed to the client computer. They also do not specify how much data should be sent back to the client computer and when. Accordingly, the Court cannot find that the limitations in question are directed to a solution to the problems of computing limitations of client computers and bandwidth constraints as described in the specification.

The Court finds, therefore, that dependent Claims 37 and 39 are directed to the same abstract idea as Claim 32.

c. Claims 19, 24, and 26

Eolas argues that Claims 32, 37, and 37 are representative of Claims 19, 24, and 26, because there is no material difference between the claims other than the fact that the latter set of claims are system claims, whereas the former set of claims are method claims. *See* ECF No. 840-3 at 21. Eolas contends that, in light of their material similarity, claims 19, 24, and 26 are not directed to an abstract idea for the same reasons that claims 32, 37, and 39 are not directed to an abstract idea. *Id.*

The Court agrees with Eolas that Claims 32, 37, and 39 are representative of claims 19, 24, and 26. The Court concludes that, because Claims 32, 37, and 39 are representative of Claims 19, 24, and 26, the latter are directed to the same abstract idea as Claims 32, 37, and 39, for the reasons discussed in detail above. *See Alice*, 573 U.S. at 226 (holding that system claims that "are no different from the method claims in substance" are abstract and ineligible "for substantially the same reasons" as the method claims).

d. Claim 45

Eolas argues, and the Court agrees, that Claim 45 recites a method that is substantially similar to the method described in Claims 32 and 39. *See* ECF No. 840-3 at 31.

Eolas argues that Claim 45 is not directed to an abstract idea because, in addition to the

elements it shares with Claims 32 and 39, Claim 45 also recites limitations not found in Claims 32 and 39, which require that one or more computers generate and send commands to coordinate activity of the separate computers working together to perform "viewing transformations" to enable the interaction with at least part of the object on the client computer browser. *See* ECF No. 840-3 at 31 (citing '507 patent at 25:7-11). The term "viewing transformations" was construed as "operations performed on data for visual display to a user." ECF No. 212 at 31. Eolas contends that the "viewing transformations" limitations in Claim 45 compel a finding that the claim is not directed to an abstract idea, because such limitations "help provide the 3D view" in the embodiments shown in Figures 9 and 10 of the '507 patent, and because the "human mind is not equipped" to perform the viewing transformations described in the claim. ECF No. 840-3 at 31.

It is undisputed that Claim 45 is materially similar to Claims 32 and 39, which the Court has found to be directed to an abstract concept. In light of the material similarity between the claims, Claim 45 would likewise be directed to the same abstract concept as Claims 32 and 39, unless Claim 45 recites an element that it does not share with Claims 32 and 39 that indicates that its focus is a specific, non-abstract technological improvement.

Here, the only aspect of Claim 45 that Eolas contends is materially distinct from those of Claims 32 and 39 are the "viewing transformation" limitations. Eolas has not shown that such limitations convert Claim 45 from one directed to an abstract idea to one directed to a non-abstract technological solution. Eolas has not explained why the "viewing transformation" limitations distinguish Claim 45 from the other asserted claims in terms of the claimed method's ability to solve a technological problem. Further, Eolas' reference to Figures 9[9] and 10[10], which are embodiments of the claimed invention, is unavailing. At Eolas' request, the term "viewing transformations" was construed to exclude embodiments described in the specification. *See* ECF No. 212 at 29-31. Accordingly, any details in these figures as to what "viewing transformations"

[9] Figure 9 illustrates how images sent to a browser can be displayed in the browser after the browser has communicated with remote computers, and how a browser can include control buttons that a user can use to interact with images. *See* '507 patent at 16:17-36.

[10] Figure 10 is discussed in detail above.

could entail are not a part of the § 101 analysis. *ChargePoint*, 920 F.3d at 769 (holding that, when conducting the § 101 inquiry, "the specification cannot be used to import details from the specification if those details are not claimed").

The Court finds that the "viewing transformation" limitations in question do not materially distinguish Claim 45 from Claims 32 and 39 in a manner that would transform Claim 45 into a patent-eligible claim at step one. As noted, these limitations require that separate computers working together perform, based on commands sent by the coordinating computers, "viewing transformations" (as construed, "operations performed on data for visual display to a user") to enable interaction with objects on the client computer browser. These limitations do not solve the abstractness problem of Claims 32 and 39 because the limitations do not amount to a requirement that the computing work and data for enabling interactivity on the client computer browser will be distributed in a manner that would solve the problems discussed in the specification. That these limitations require that remote computers jointly perform unspecified "operations" on data for visual display does not mean that the computing work that must be performed and the data that must be transferred to enable interactivity on a client computer browser will be allocated in a manner that will circumvent the computing limitations of client computers and bandwidth constraints. Thus, the limitations in question do not save Claim 45 from abstraction. The Court finds that Claim 45, like Claims 32 and 39, is directed to the abstract idea of enabling interactivity with remote objects on a client computer browser using distributed computing.

2. *Alice* step two

Because the Court has found that all of the asserted claims are directed to an abstract idea at step one of the *Alice* inquiry, the Court now proceeds to step two.

At *Alice* step two, courts look for an "inventive concept" and "consider the elements of each claim both individually and as an ordered combination to determine whether the additional elements transform the nature of the claim into a patent eligible application. The second step of the *Alice* test is satisfied when the claim limitations involve more than performance of well-understood, routine, [and] conventional activities previously known to the industry." *Berkheimer*, 881 F.3d at 1367 (internal citations and quotation marks omitted) (alterations in the original).

"[S]imply appending conventional steps, specified at a high level of generality, to laws of nature, natural phenomena, and abstract ideas cannot make those laws, phenomena, and ideas patentable." *Mayo*, 566 U.S. at 82. "To save a patent at step two, an inventive concept must be evident in the claims." *RecogniCorp, LLC v. Nintendo Co.*, 855 F.3d 1322, 1327 (Fed. Cir. 2017) (citation omitted). "Whether a combination of claim limitations supplies an inventive concept that renders a claim 'significantly more' than an abstract idea to which it is directed is a question of law." *BSG Tech LLC v. Buyseasons, Inc.*, 899 F.3d 1281, 1290 (Fed. Cir. 2018). "Underlying factual determinations may inform this legal determination." *Id.* (citing *Berkheimer*, 881 F.3d at 1368). "When there is no genuine issue of material fact regarding whether the claim element or claimed combination is well-understood, routine, conventional to a skilled artisan in the relevant field, this issue can be decided on summary judgment as a matter of law." *Berkheimer*, 881 F.3d at 1368.

Here, Eolas argues that the asserted claims satisfy the requirements for patent-eligibility at step two because the asserted claims contain the following limitations, which Eolas contends constitute "unconventional technical solutions to technical problems": (1) the claims require "transmitting information over the Web, wherein the information enables a Web browser to: (a) select, based upon the information, an interactive-content application from among a plurality of different interactive-content applications ('507 Patent at 23:51-53); and (b) automatically invoke the selected interactive-content application to enable the user to employ the selected interactive-content application to interact within a Web page wherein the automatically invoked interactive-content application has been configured to operate as part of a distributed application located on two or more remote distributed application computers connected to the Web"; (2) the claims require the use of an interactive-content application that resides in part on the "client side"[11]; and (3) the claims require that the "systems and methods" claimed therein "be performed on the World Wide Web[.]" ECF No. 840-3 at 38-39.

[11] The presence of the "interactive-content application" on the client computer is, according to the claim language, achieved via the limitations requiring that the browser on the client computer select and invoke one such application. *See, e.g.*, '507 patent at 23:35-44. Thus, the presence of the interactive-content application on the client computer is already captured by the other claim limitations to which Eolas points.

The Court finds that the claim limitations to which Eolas points as supplying the requisite inventive concept for patent-eligibility at step two, whether individually or as an ordered combination, embody the abstract idea to which the asserted claims are directed, which is enabling interactivity with remote objects in client computer browsers using distributed computing. Indeed, the limitations to which Eolas points are the ones the Court analyzed in detail at step one and found to be directed to an abstract idea, and not a specific technological solution. The limitations in question, therefore, cannot supply the requisite inventive concept at step two. *See BSG Tech*, 899 F.3d at 1290 ("It has been clear since *Alice* that a claimed invention's use of the ineligible concept to which it is directed cannot supply the inventive concept that renders the invention 'significantly more' than that ineligible concept."); *Simio, LLC v. FlexSim Software Prod., Inc.*, 983 F.3d 1353, 1363 (Fed. Cir. 2020) (same). Because of their abstract nature, the limitations in question cannot render the asserted claims patent-eligible at step two even if the Court assumes that the limitations are unconventional or innovative.[12] This is because "a claim for a *new* abstract idea is still an abstract idea." *Synopsys, Inc. v. Mentor Graphics Corp.*, 839 F.3d 1138, 1151 (Fed. Cir. 2016) (emphasis in the original); *see also Finjan*, 879 F.3d at 1305 ("[A] result, even an innovative result, is not itself patentable.") (collecting cases).

The remaining aspects of the asserted claims do not recite anything that would permit a finding that the asserted claims amount to "significantly more than a patent on the abstract idea itself." *Simio*, 983 F.3d at 1363 (citation and internal quotation marks omitted). It is undisputed that they require the use of components (e.g., client computers, servers, remote computers) and basic functions (e.g., computers communicating over networks or the internet, data processing and transfer) that are generic and basic. The specification indicates that the components and computer

[12] Defendants have shown that David C. Martin, one of the co-inventors of the '507 patent, testified at his deposition that he does not claim that he and the other co-inventors of the '507 patent invented distributed computing in general, ECF No. 830-34 at 19; distributed applications in general, *id.* at 21; or parallel processing in general, *id.* at 9. Eolas has not rebutted this evidence, nor has it pointed to any evidence showing that the asserted claims require distributed computing that differs from the general distributed computing that was known at the time of the claimed invention (and if so, how it differs). Even had Eolas shown, which it has not, that the asserted claims require distributed computing that was unconventional at the time of the claimed invention, that still would not save the asserted claims from invalidity under § 101 because the claims do not recite in non-abstract terms how to perform it.

and network functions recited in the claims are generic.[13] Eolas has pointed to no evidence or authority suggesting otherwise. The asserted claims' recitation of generic components and basic functions, therefore, does not save them from ineligibility at step two. *See, e.g., buySAFE, Inc. v. Google, Inc.*, 765 F.3d 1350, 1355 (Fed. Cir. 2014) ("The claims' invocation of computers adds no inventive concept. . . . That a computer receives and sends the information over a network—with no further specification—is not even arguably inventive. The computers in *Alice* were receiving and sending information over networks connecting the intermediary to the other institutions involved, and the Court found the claimed role of the computers insufficient."); *Affinity Labs I*, 838 F.3d at 1262 (holding that a claim was not patent-eligible at step two where it "simply recites the use of generic features . . . as well as routine functions . . . to implement the underlying [abstract] idea").

Eolas cites the Court's findings in the context of Defendants' summary judgment motion on obviousness-type double patenting ("OTDP") for the proposition that the asserted claims' limitations requiring that the claimed methods and systems be practiced on the World Wide Web render the asserted claims patent-eligible at step two. *See* ECF No. 840-3 at 38 (citing ECF No. 655 at 10-11). The citation is not persuasive. The OTDP analysis requires a comparison of the claims of two related patents for the purpose of determining whether the claims in the latter patent are invalid on the basis that they were obvious in light of the claims in the earlier patent.[14] In

[13] *See., e.g.*, '507 patent at 8:17-13 (discussing "many possible computer types of configurations capable of being used with the present invention"); *id.* at 1:30-51 ("standard protocols" and "uniform" standards for internet and network communications); *id.* at. 16:61-63 ("various programming languages and techniques can be used to implement the disclosed invention"); *id.* at 4:15-20 (discussing data processing and data transfers).

[14] "Non-statutory, or 'obviousness-type,' double patenting is a judicially created doctrine adopted to prevent claims in separate applications or patents that do not recite the 'same' invention, but nonetheless claim inventions so alike that granting both exclusive rights would effectively extend the life of patent protection." *Perricone v. Medicis Pharm. Corp.*, 432 F.3d 1368, 1373 (Fed. Cir. 2005). "The obviousness-type double patenting analysis involves two steps: 'First, the court construes the claim[s] in the earlier patent and the claim[s] in the later patent and determines the differences. Second, the court determines whether those differences render the claims patentably distinct.'" *Abbvie Inc. v. Mathilda and Terence Kennedy Inst. of Rheumatology Trust*, 764 F.3d 1366, 1374 (Fed. Cir. 2014) (citation omitted) (alterations in original) (internal quotation marks omitted). "The second part of this analysis is analogous to the obviousness inquiry under 35 U.S.C. § 103 in the sense that if an earlier claim renders obvious or anticipates a later claim, the later claim is not patentably distinct and is thus invalid for obviousness-type double patenting."

resolving Defendants' summary judgment motion on OTDP, the Court found that Defendants were not entitled to summary judgment that the '507 asserted claims were invalid on OTDP grounds because Defendants failed to proffer sufficient evidence showing that the '507 asserted claims were not "patentably distinct" from the claims in earlier patents that share the same specification with the '507 patent. ECF No. 655 at 11. In making this finding, the Court relied, in relevant part, on limitations in the '507 patent claims requiring that the claimed methods and systems be practiced on the World Wide Web. *See id.* at 11-12.

Eolas has cited no authority showing that the Court's analysis and findings in the context of OTDP bear on the question of patent-eligibility under § 101. On the other hand, the Federal Circuit has routinely held, in the context of § 101, that claim language requiring that the claimed invention be performed on the internet merely confines the claimed invention to a particular technological environment, and that this is not enough, as a matter of law, to convert the asserted claims into patent-eligible subject matter at step two. *See, e.g.*, *Ultramercial, Inc. v. Hulu, LLC*, 772 F.3d 709, 716 (Fed. Cir. 2014) ("The claims' invocation of the Internet also adds no inventive concept. As we have held, the use of the Internet is not sufficient to save otherwise abstract claims from ineligibility under § 101."); *Intell. Ventures I LLC v. Cap. One Bank (USA)*, 792 F.3d 1363, 1366 (Fed. Cir. 2015) (holding that "[a]n abstract idea does not become nonabstract by limiting the invention to a particular . . . technological environment, such as the Internet"). In light of this clear Federal Circuit authority, the Court finds that the "World Wide Web" limitations in the asserted claims merely require a particular technological environment and, as such, they cannot, as a matter of law, save the asserted claims from ineligibility under § 101.

Citing *Bascom Glob. Internet Servs., Inc. v. AT&T Mobility, LLC*, 827 F.3d 1341, 1352 (Fed. Cir. 2016), Eolas contends conclusorily that the limitations to which it points satisfy the requirements of *Alice* step two because they "do not preempt all systems and methods for securely providing interactive content over the World Wide Web to client computers having limited computing capabilities that also provides improved scalability and resource management." ECF

UCB, Inc. v. Accord Healthcare, Inc., 890 F.3d 1313, 1323 (Fed. Cir. 2018) (citation omitted).

No. 840-3 at 38. *Bascom* is distinguishable. There, the claimed invention was a method and system for customizing filters of internet content at a remote ISP server. The district court held that the asserted claims were invalid under § 101 because they were directed to the abstract idea of filtering content. *Id.* at 1346-47. The Federal Circuit reversed this holding, finding that Bascom had shown that "an inventive concept can be found in the ordered combination of claim limitations," namely limitations that "claim[] a technology-based solution (*not an abstract-idea-based solution implemented with generic technical components in a conventional way*) to filter content on the Internet that overcomes existing problems with other Internet filtering systems." *Id.* at 1351-52 (emphasis added). The technology-based solution that rendered the claims patent-eligible at step two was discussed in the specification and captured specifically in the claims; that solution, which distinguished the claimed invention from the prior art according to the specification, involved installing the filter at the ISP server and having the ISP associate individual users with a specific request to access a website so that the filtering of internet content could be customized for each user. *Id.* at 1343-45. According to the specification, this solution was unlike other known methods for filtering content because it allowed customization to occur at a remote server, where the filtering could not be thwarted by a computer-literate end-user. *Id.* In light of this, the Federal Circuit held that the claims were unlike those that were held to be invalid under § 101 in other cases on the basis that they preempted uses of an abstract idea on generic computer components or technological environments. *Id.*

Here, unlike in *Bascom*, the limitations to which Eolas point do not embody a "technology-based solution" and instead amount to nothing more than an "abstract-idea based solution implemented with generic technical components in a conventional way." *See id.* at 1351-52. In contrast to the technology-based solution discussed in the specification and recited in the claims in *Bascom*, here, the solution discussed in the specification (i.e., distributing the computing required for enabling interactivity on a client computer browser so as to circumvent the limitations of client computers and bandwidth constraints) is not captured in the asserted claims in a non-abstract way, as discussed in detail above. The asserted claims merely demand that interactivity on the client computer browser be enabled via distributed computing, without specifying a particular way of

doing so that would circumvent the problems discussed in the specification. Where, as here, "a claim directed to an abstract idea contains no restriction on how the result is accomplished" and the "mechanism . . . is not described, although this is stated to be the essential innovation . . . then the claim is not patent-eligible." *Symantec*, 838 F.3d at 1316 (holding that asserted claims were not patent-eligible at step two because of the absence of any "specific or limiting recitation of . . . improved computer technology" in the patent and distinguishing *Bascom* on that basis) (citation and internal quotation marks omitted).

For these reasons, the asserted claims do not satisfy the standard for patent-eligibility at step two and summary judgment that the asserted claims are invalid under § 101 is appropriate. *See BSG Tech*, 899 F.3d at 1291 (affirming summary judgment that claims were invalid under § 101 in relevant part because the "alleged unconventional feature" was a "restate[ment]" and "reformulate[ion]" of the abstract idea found at step one, and there was no genuine dispute that "other, non-abstract features of the claimed invention" were well-understood, routine, and conventional).

The Court, therefore, GRANTS Defendants' motion for summary judgment under § 101 with respect to all seven asserted claims.

B. Remaining motions

In light of the Court's finding and conclusion that the seven asserted claims are invalid under § 101, the Court need not reach and DENIES AS MOOT Defendants' summary judgment motion as to non-infringement, Plaintiffs' summary judgment motion as to certain of Defendants' affirmative defenses, and the parties' motions to exclude certain expert testimony.

CONCLUSION

For the foregoing reasons, the Court GRANTS Defendants' motion for summary judgment under § 101 and finds and concludes that the asserted claims of the '507 patent (Claims 32, 37, 39, 19, 24, 6, and 45) are invalid under 35 U.S.C. § 101. In light of this ruling, the Court DENIES AS MOOT Defendants' summary judgment motion as to non-infringement; Plaintiffs' motion for summary judgment as to certain of Defendants' affirmative defenses; and the parties' motions to exclude certain expert testimony.

The Clerk shall terminate these consolidated actions.

IT IS SO ORDERED.

Dated: May 16, 2022

JON S. TIGAR
United States District Judge

United States District Court
Northern District of California

UNITED STATES DISTRICT COURT

NORTHERN DISTRICT OF CALIFORNIA

EOLAS TECHNOLOGIES INCORPORATED,

Plaintiff,

v.

AMAZON.COM, INC,

Defendant.

Case No. 17-cv-03022-JST

CLERK'S JUDGEMENT

Re: Dkt. No. 859

Pursuant to the Order Granting Defendants' Motion for Summary Judgment Under 35 U.S.C. § 101; Denying Defendants' Motion for Summary Judgment of Non-Infringement as Moot; Denying Plaintiffs' Motion for Summary Judgment as Moot; Denying Motions to Exclude or Strike Expert Testimony as Moot signed May 16, 2022, judgment is hereby entered.

IT IS SO ORDERED AND ADJUDGED.

Dated: Monday, May 16, 2022

Mark B. Busby
Clerk, United States District Court

Mark B. Busby
By: _____
Mauriona Lee, Deputy Clerk to the
Honorable JON S. TIGAR

United States District Court
Northern District of California

US009195507B1

(12) **United States Patent**
Doyle et al.

(10) **Patent No.: US 9,195,507 B1**
(45) **Date of Patent: Nov. 24, 2015**

(54) **DISTRIBUTED HYPERMEDIA METHOD AND SYSTEM FOR AUTOMATICALLY INVOKING EXTERNAL APPLICATION PROVIDING INTERACTION AND DISPLAY OF EMBEDDED OBJECTS WITHIN A HYPERMEDIA DOCUMENT**

(75) Inventors: **Michael D. Doyle**, Wheaton, IL (US); **David C. Martin**, San Jose, CA (US); **Cheong S. Ang**, Los Altos, CA (US)

(73) Assignee: **Eolas Technologies Incorporated**, Tyler, TX (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 1042 days.

(21) Appl. No.: **13/292,434**

(22) Filed: **Nov. 9, 2011**

Related U.S. Application Data

(63) Continuation of application No. 11/593,258, filed on Nov. 2, 2006, now Pat. No. 8,082,293, which is a continuation of application No. 10/217,955, filed on Aug. 9, 2002, now Pat. No. 7,599,985, which is a continuation of application No. 09/075,359, filed on May 8, 1998, now abandoned, which is a continuation of application No. 08/324,443, filed on Oct. 17, 1994, now Pat. No. 5,838,906.

(51) **Int. Cl.**
G06F 9/46 (2006.01)
G06F 9/50 (2006.01)
G06F 17/30 (2006.01)

(52) **U.S. Cl.**
CPC ***G06F 9/5027*** (2013.01); ***G06F 9/5055*** (2013.01)

(58) **Field of Classification Search**
CPC G06F 17/30988; G06F 2209/509; G06F 2209/549; G06F 9/5027; G06F 9/5055; G06F 9/547
See application file for complete search history.

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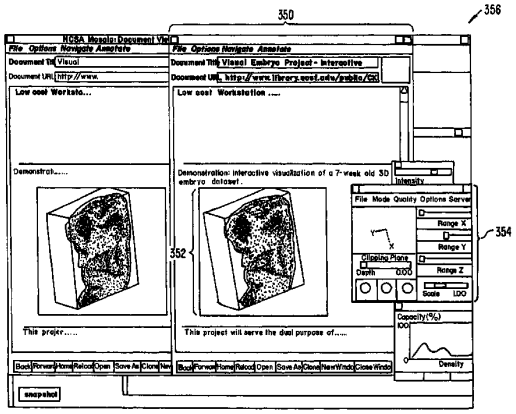
(74) *Attorney, Agent, or Firm* — Charles E. Krueger

(57) **ABSTRACT**

At least one file containing information is transferred across a distributed network environment. The information allows at least one application configured to execute on at least one client workstation to display a portion of a distributed hypermedia document within a browser-controlled window, to respond to text formats to initiate processing specified by the text formats, to identify an embed text format which corresponds to a first location in the distributed hypermedia document and to automatically invoke program code being part of a distributed application located on two or more computers coupled to the distributed hypermedia network, in response to the identifying of the embed text format, in order to enable an end-user to directly interact with an object when the object is displayed within a display area created at the first location within the portion of the distributed hypermedia document being displayed in the browser-controlled window.

56 Claims, 9 Drawing Sheets



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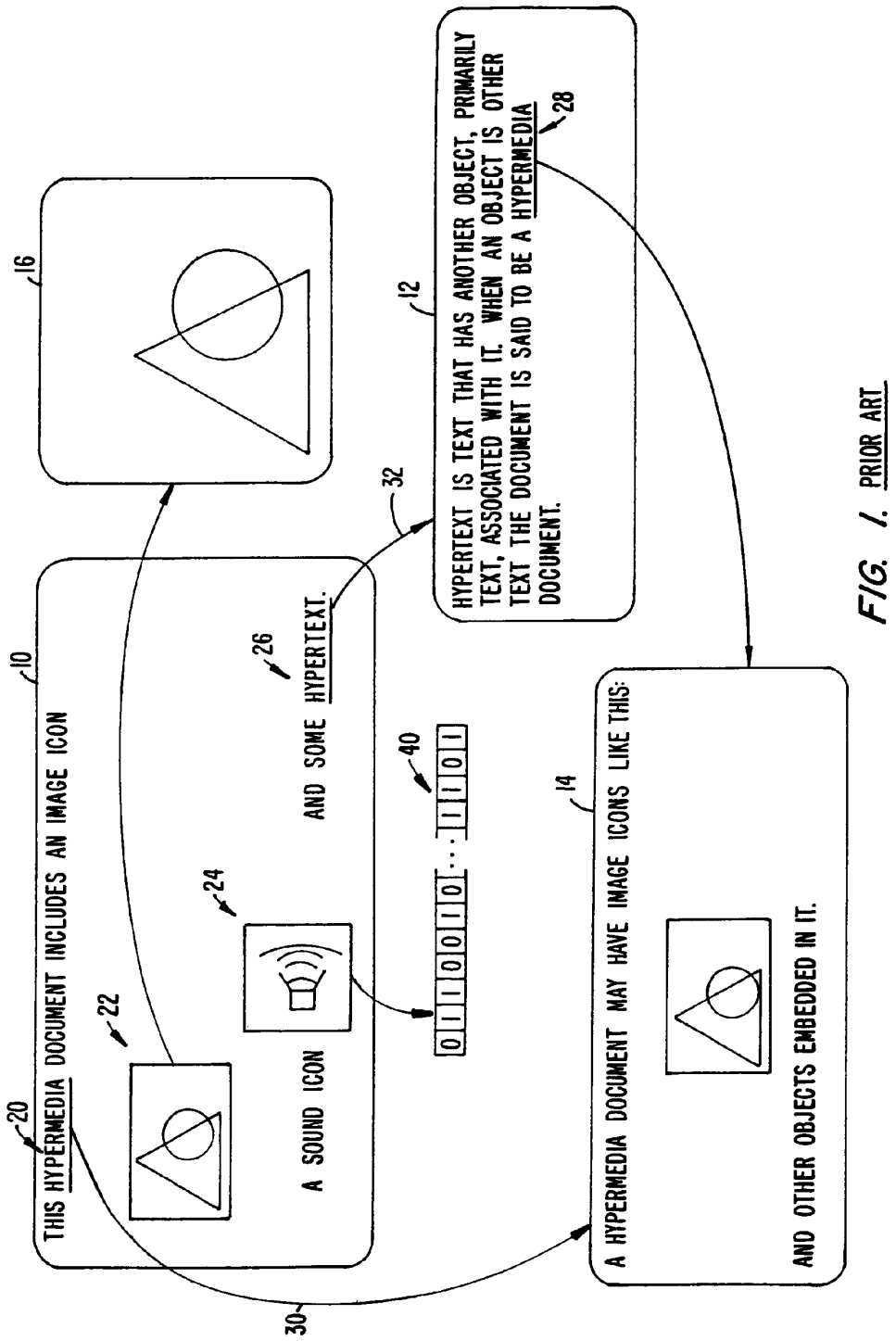

FIG. 1. PRIOR ART

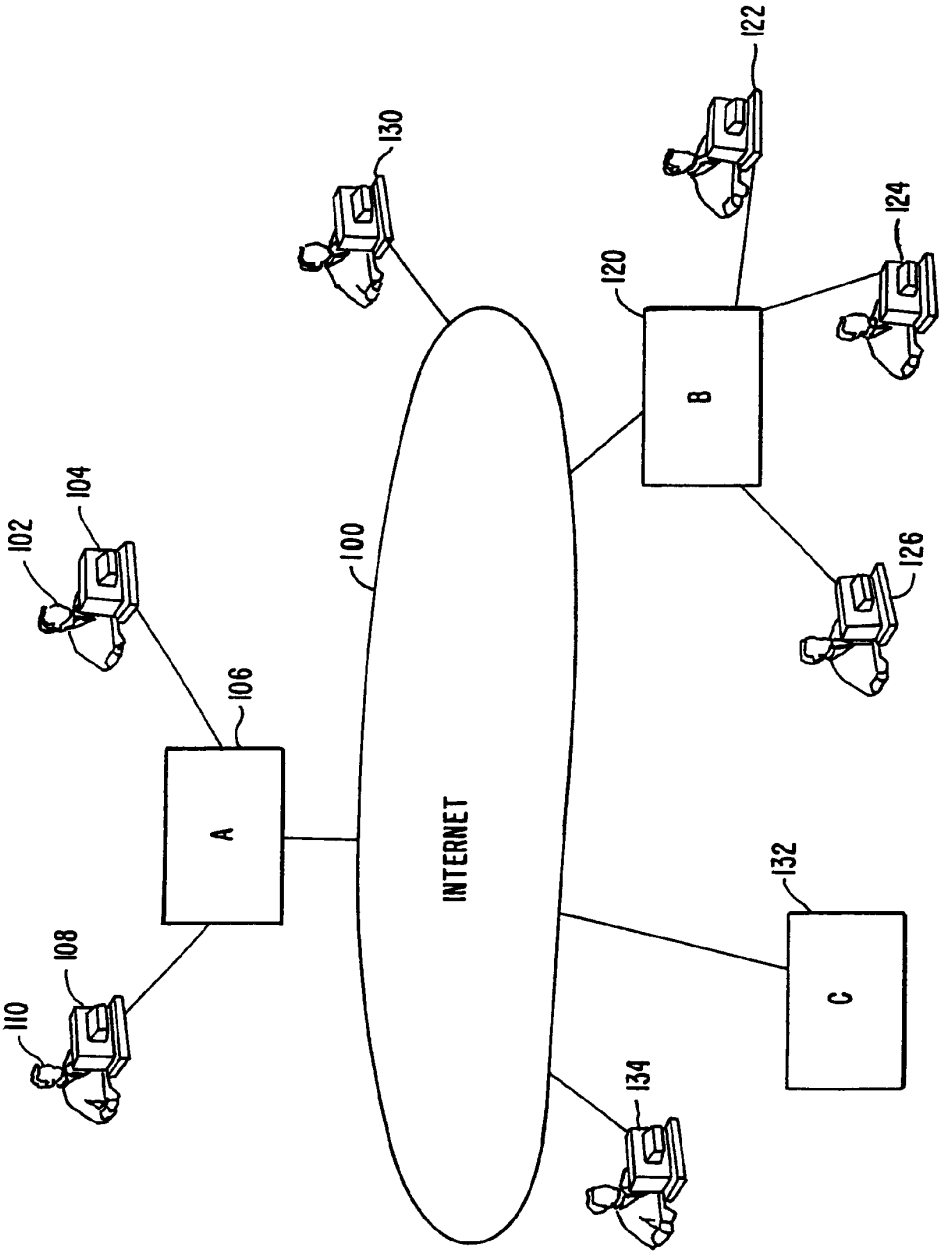

FIG. 2. PRIOR ART

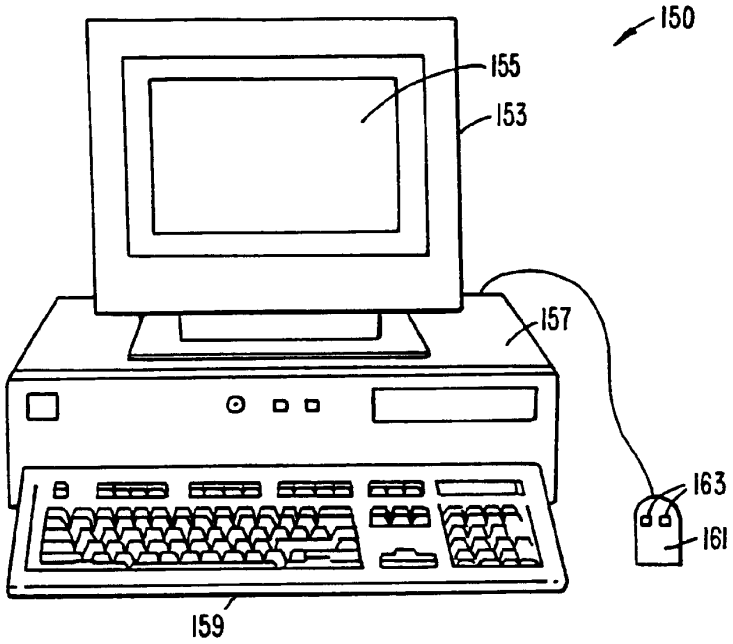
150
155
153
157
163
161
159

FIG. 3.

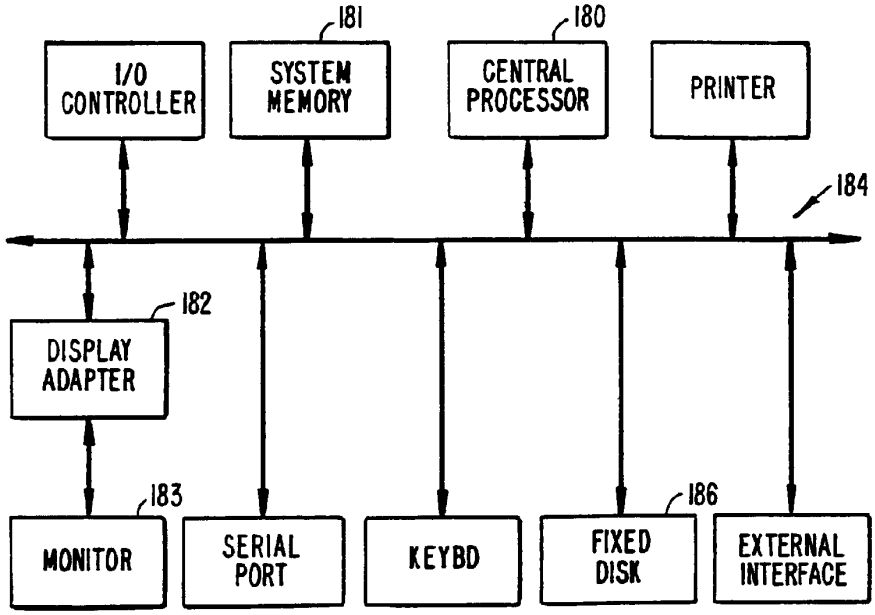
181
180
I/O CONTROLLER
SYSTEM MEMORY
CENTRAL PROCESSOR
PRINTER
184
182
DISPLAY ADAPTER
183
186
MONITOR
SERIAL PORT
KEYBD
FIXED DISK
EXTERNAL INTERFACE

FIG. 4.

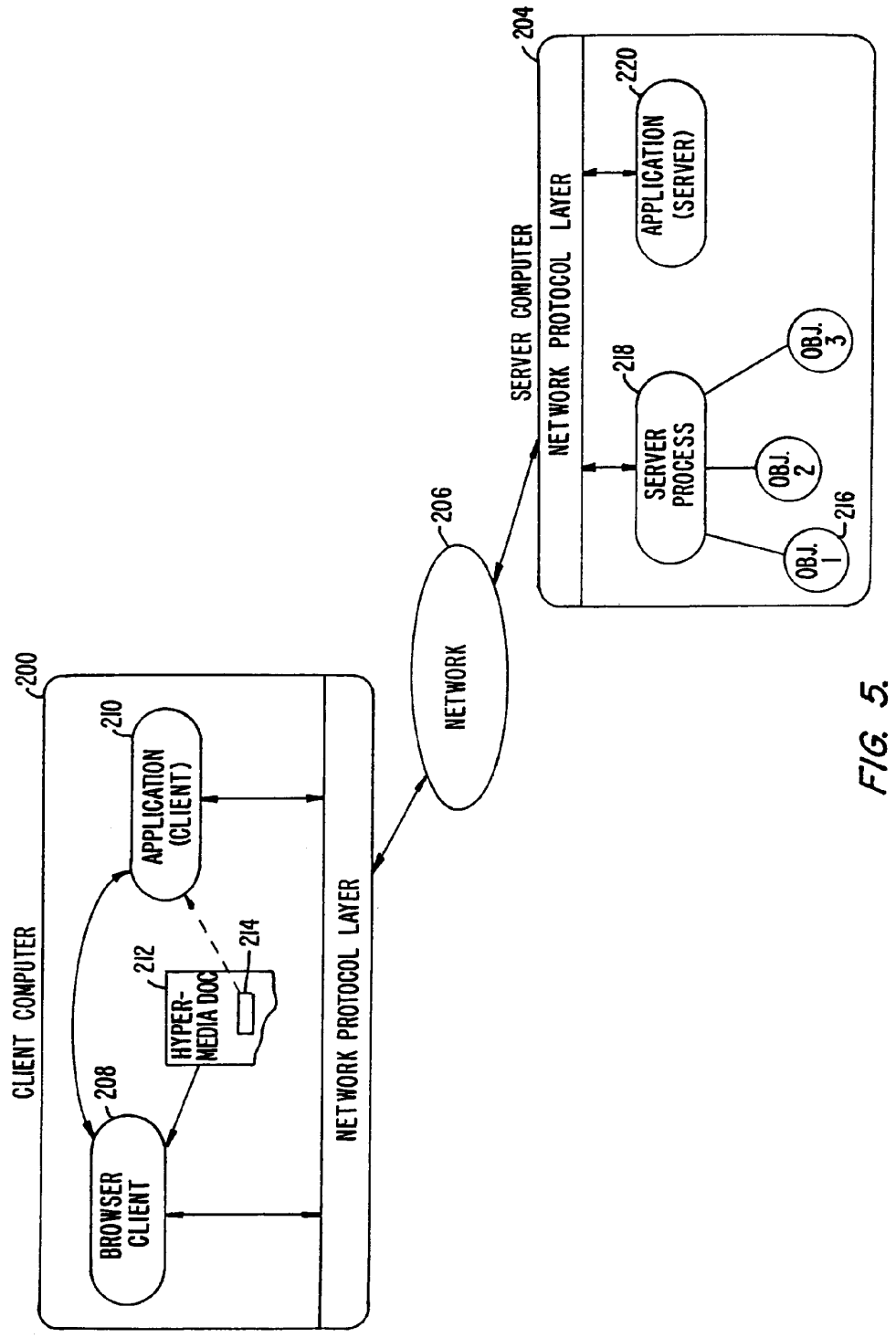
200
CLIENT COMPUTER
210
APPLICATION (CLIENT)
212
HYPER-MEDIA DOC
214
208
BROWSER CLIENT
NETWORK PROTOCOL LAYER
206
NETWORK
204
SERVER COMPUTER
NETWORK PROTOCOL LAYER
220
APPLICATION (SERVER)
218
SERVER PROCESS
OBJ. 3
OBJ. 2
OBJ. 1
216

FIG. 5.

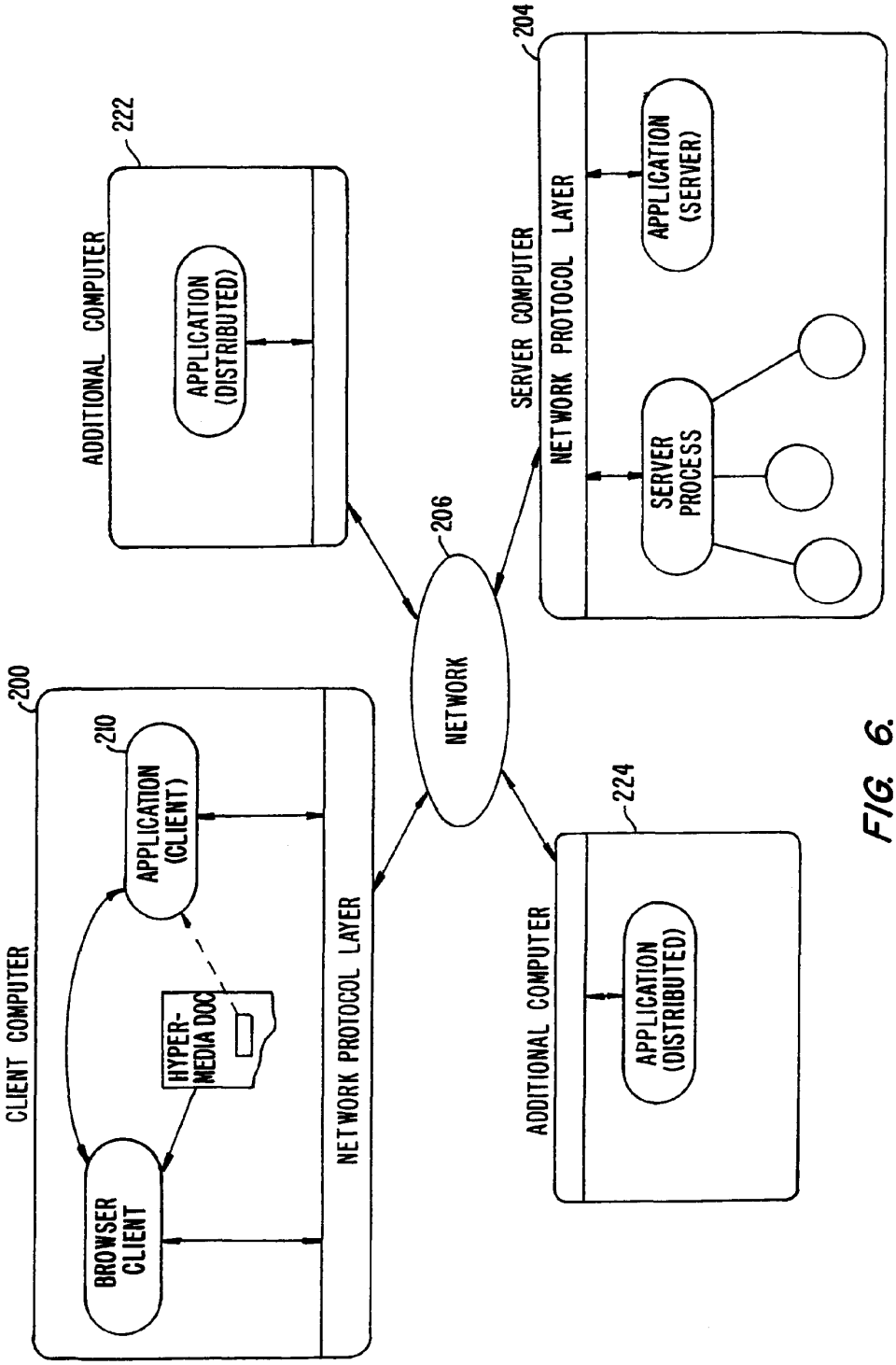
200
CLIENT COMPUTER
210
APPLICATION (CLIENT)
HYPER-MEDIA DOC
BROWSER CLIENT
NETWORK PROTOCOL LAYER
NETWORK
206
222
ADDITIONAL COMPUTER
APPLICATION (DISTRIBUTED)
204
SERVER COMPUTER
NETWORK PROTOCOL LAYER
APPLICATION (SERVER)
SERVER PROCESS
224
ADDITIONAL COMPUTER
APPLICATION (DISTRIBUTED)

FIG. 6.

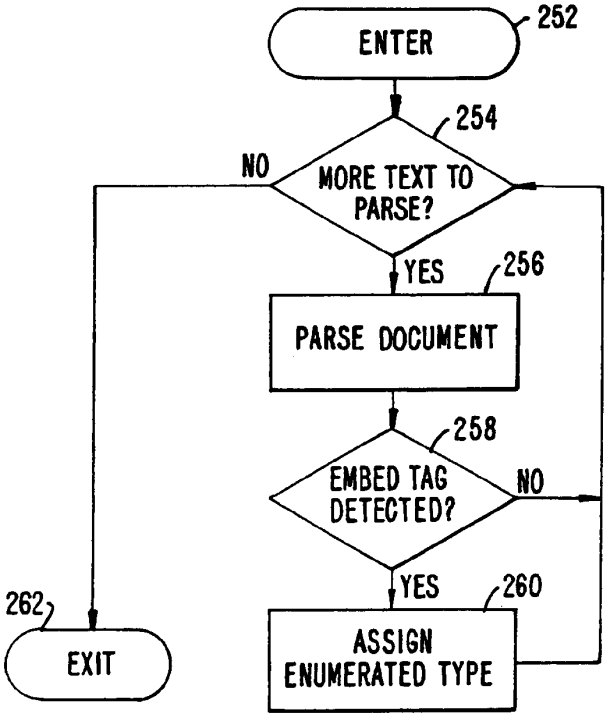
ENTER
252
254
MORE TEXT TO PARSE?
NO
YES
256
PARSE DOCUMENT
258
EMBED TAG DETECTED?
NO
YES
260
ASSIGN ENUMERATED TYPE
262
EXIT

FIG. 7A.

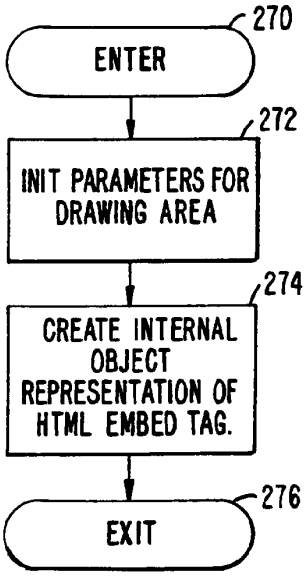
ENTER
270
272
INIT PARAMETERS FOR DRAWING AREA
274
CREATE INTERNAL OBJECT REPRESENTATION OF HTML EMBED TAG.
276
EXIT

FIG. 7B.

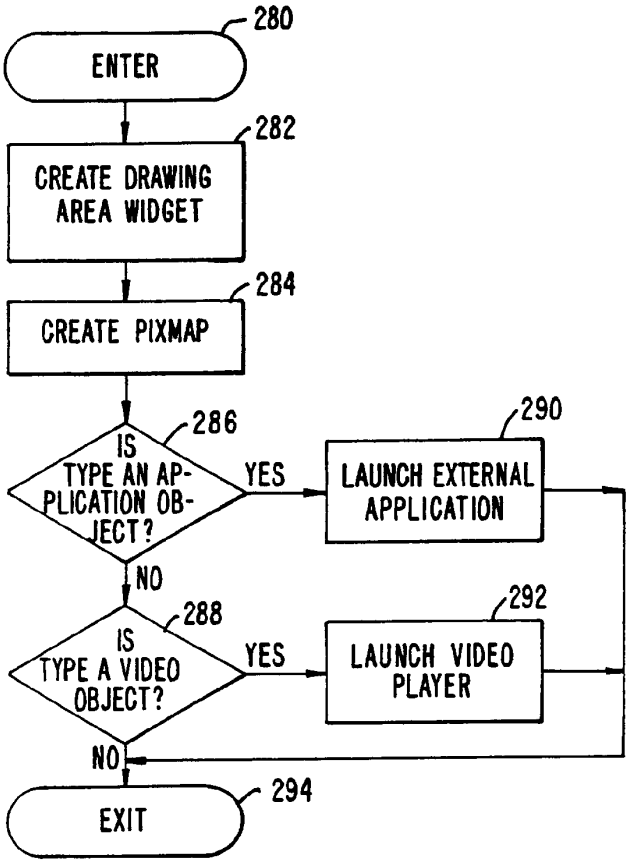
280
ENTER
282
CREATE DRAWING AREA WIDGET
284
CREATE PIXMAP
286
IS TYPE AN APPLICATION OBJECT?
YES
290
LAUNCH EXTERNAL APPLICATION
NO
288
IS TYPE A VIDEO OBJECT?
YES
292
LAUNCH VIDEO PLAYER
NO
294
EXIT

FIG. 8A.

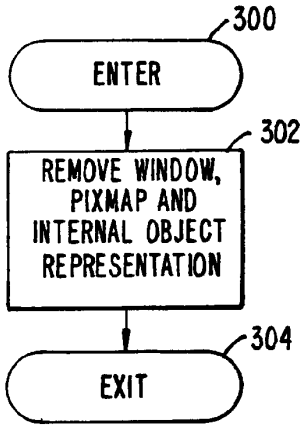
300
ENTER
302
REMOVE WINDOW, PIXMAP AND INTERNAL OBJECT REPRESENTATION
304
EXIT

FIG. 8B.

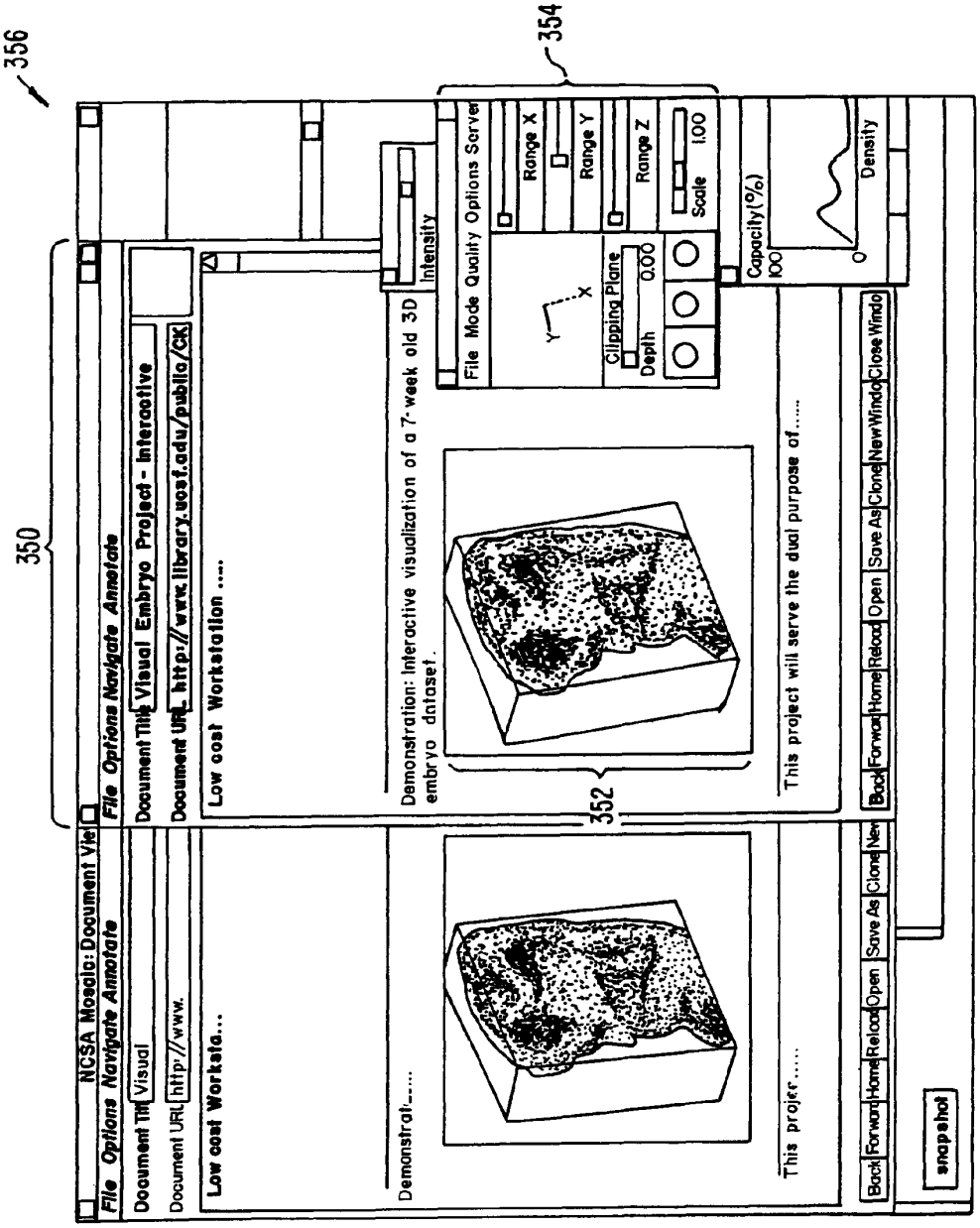
356
350
354
352
NCSA Mosaic: Document Vie
File Options Navigate Annotate
Document Title Visual
Document URL http://www.
Low cost Workstation...
Demonstrat.....
This projer.....
Back Forward Home Reload Open Save As Clone New
snapshot
File Options Navigate Annotate
Document Title Visual Embryo Project - interactive
Document URL http://www.library.uosf.edu/public/GK
Low cost Workstation .....
Demonstration: interactive visualization of a 7-week old 3D embryo dataset.
This project will serve the dual purpose of.....
Intensity
File Mode Quality Options Server
Range X
Range Y
Range Z
Scale 1.00
Clipping Plane
Depth 0.00
Capacity(%)
100
0
Density
Back Forward Home Reload Open Save As Clone NewWindo Close Windo

FIG. 9.

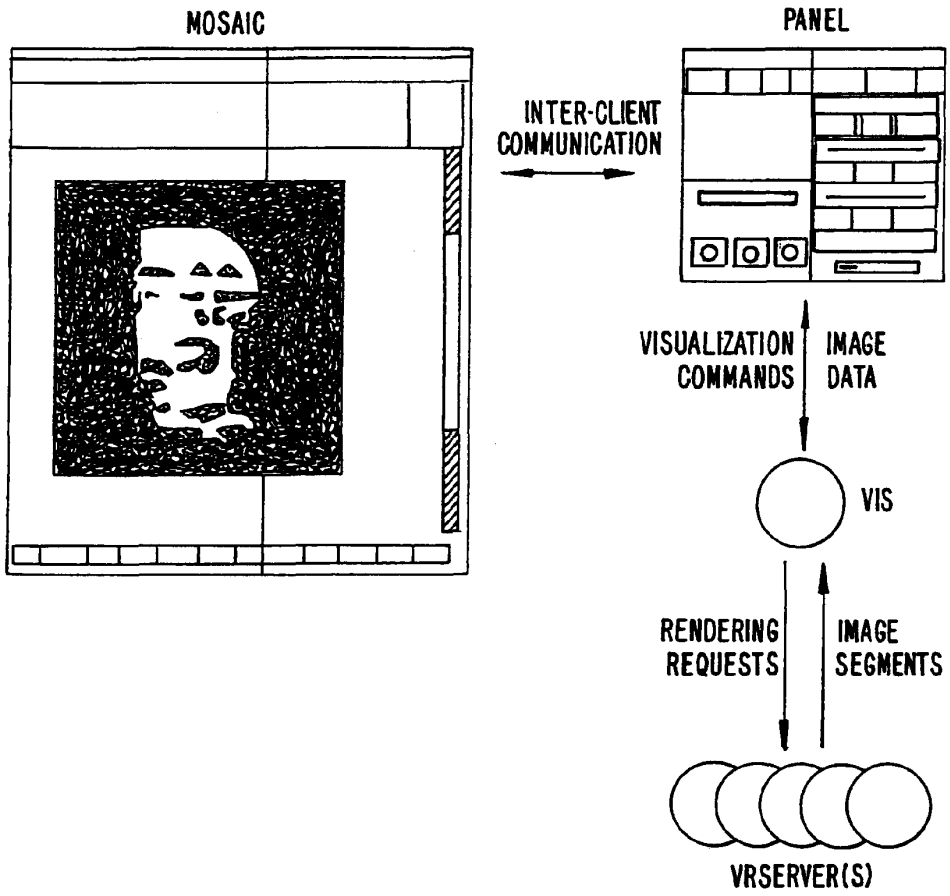
MOSAIC
PANEL
INTER-CLIENT COMMUNICATION
VISUALIZATION COMMANDS
IMAGE DATA
VIS
RENDERING REQUESTS
IMAGE SEGMENTS
VRSERVER(S)

FIG. 10.

DISTRIBUTED HYPERMEDIA METHOD AND SYSTEM FOR AUTOMATICALLY INVOKING EXTERNAL APPLICATION PROVIDING INTERACTION AND DISPLAY OF EMBEDDED OBJECTS WITHIN A HYPERMEDIA DOCUMENT

RELATED APPLICATIONS

This application is a continuation and claims the benefit of U.S. application Ser. No. 11/593,258 filed Nov. 2, 2006, which is a continuation and claims the benefit of U.S. application Ser. No. 10/217,955 filed Aug. 9, 2002, now U.S. Pat. No. 7,559,985 which is a continuation and claims the benefit of U.S. application Ser. No. 09/075,359 filed May 8, 1998, now abandoned, which is a continuation and claims the benefit of U.S. application Ser. No. 08/324,443 filed Oct. 17, 1994, now U.S. Pat. No. 5,838,906, the disclosures of which are all hereby incorporated by reference.

BACKGROUND OF THE INVENTION

This invention relates generally to manipulating data in a computer network, and specifically to retrieving, presenting and manipulating embedded program objects in distributed hypermedia systems.

Computer networks are becoming increasingly popular as a medium for locating and accessing a wide range of data from locations all over the world. The most popular global network is the Internet with millions of computer systems connected to it. The Internet has become popular due to widely adopted standard protocols that allow a vast interconnection of computers and localized computer networks to communicate with each other. Computer systems connected to a network such as the Internet may be of varying types, e.g., mainframes, workstations, personal computers, etc. The computers are manufactured by different companies using proprietary hardware and operating systems and thus have incompatibilities in their instruction sets, busses, software, file formats and other aspects of their architecture and operating systems. Localized computer networks connected to the Internet may be incompatible with other computer systems and localized networks in terms of the physical layer of communication including the specific hardware used to implement the network. Also, different networks use differing, incompatible protocols for transferring information and are not able to communicate with each other without a translation mechanism such as a "gateway".

The Internet provides a uniform and open standard for allowing various computers and networks to communicate with each other. For example, the Internet uses Transfer Control Protocol/Internet Protocol ("TCP/IP") that defines a uniform packet-switched communication standard which is ultimately used in every transfer of information that takes place over the Internet.

Other Internet standards are the HyperText Transmission Protocol ("HTTP") that allows hypertext documents to be exchanged freely among any computers connected to the Internet and HyperText Markup Language ("HTML") that defines the way in which hypertext documents designate links to information. See, e.g., Berners-Lee, T. J., "The world-wide web," Computer Networks and ISDN Systems 25 (1992).

A hypertext document is a document that allows a user to view a text document displayed on a display device connected to the user's computer and to access, retrieve and view other data objects that are linked to hypertext words or phrases in the hypertext document. In a hypertext document, the user

may "click on," or select, certain words or phrases in the text that specify a link to other documents, or data objects. In this way, the user is able to navigate easily among data objects. The data objects may be local to the user's computer system or remotely located over a network. An early hypertext system is Hypercard, by Apple Computer, Inc. Hypercard is a standalone system where the data objects are local to the user's system.

When a user selects a phrase in a hypertext document that has an associated link to another document, the linked document is retrieved and displayed on the user's display screen. This allows the user to obtain more information in an efficient and easy manner. This provides the user with a simple, intuitive and powerful way to "branch off" from a main document to learn more about topics of interest.

Objects may be text, images, sound files, video data, documents or other types of information that is presentable to a user of a computer system. When a document is primarily text and includes links to other data objects according to the hypertext format, the document is said to be a hypertext document. When graphics, sound, video or other media capable of being manipulated and presented in a computer system is used as the object linked to, the document is said to be a hypermedia document. A hypermedia document is similar to a hypertext document, except that the user is able to click on images, sound icons, video icons, etc., that link to other objects of various media types, such as additional graphics, sound, video, text, or hypermedia or hypertext documents.

FIG. **1** shows examples of hypertext and hypermedia documents and links associating data objects in the documents to other data objects. Hypermedia document **10** includes hypertext **20**, an image icon at **22**, a sound icon at **24** and more hypertext **26**. FIG. **1** shows hypermedia document **10** substantially as it would appear on a user's display screen. The user is able to select, or "click" on icons and text on a display screen by using an input device, such as a mouse, in a manner well-known in the art.

When the user clicks on the phrase "hypermedia," software running on the user's computer obtains the link associated with the phrase, symbolically shown by arrow **30**, to access hypermedia document **14**. Hypermedia document **14** is retrieved and displayed on the user's display screen. Thus, the user is presented with more information on the phrase "hypermedia." The mechanism for specifying and locating a linked object such as hypermedia document **14** is an HTML "element" that includes an object address in the format of a Uniform Resource Locator (URL).

Similarly, additional hypertext **26** can be selected by the user to access hypertext document **12** via link **32** as shown in FIG. **1**. If the user selects additional hypertext **26**, then the text for hypertext document **12** is displayed on the user screen. Note that hypertext document **12**, itself, has hypertext at **28**. Thus, the user can click on the phrase "hypermedia" while viewing document **12** to access hypermedia document **14** in a manner similar to that discussed above.

Documents, and other data objects, can be referenced by many links from many different source documents. FIG. **1** shows document **14** serving as a target link for both documents **10** and **12**. A distributed hypertext or hypermedia document typically has many links within it that specify many different data objects located in computers at different geographical locations connected by a network. Hypermedia document **10** includes image icon **22** with a link to image **16**. One method of viewing images is to include an icon, or other indicator, within the text.

Typically, the indicator is a very small image and may be a scaled down version of the full image. The indicator may be shown embedded within the text when the text is displayed on the display screen. The user may select the indicator to obtain the full image. When the user clicks on image icon **22** browser software executing on the user's computer system retrieves the corresponding full image, e.g., a bit map, and displays it by using external software called a "viewer." This results in the full image, represented by image **16**, being displayed on the screen.

An example of a browser program is the National Center for Supercomputing Application's (NCSA) Mosaic software developed by the University of Illinois at Urbana/Champaign, Ill. Another example is "Cello" available on the Internet at http://www.law.cornell.edu/. Many viewers exist that handle various file formats such as ".TIF," ".GIF," formats. When a browser program invokes a viewer program, the viewer is launched as a separate process. The view displays the full image in a separate "window" (in a windowing environment) or on a separate screen. This means that the browser program is no longer active while the viewer is active. By using indicators to act as place holders for full images that are retrieved and displayed only when a user selects the indicator, data traffic over the network is reduced. Also, since the retrieval and display of large images may require several seconds or more of transfer time the user does not have to wait to have images transferred that are of no interest to the user.

Returning to FIG. **1**, another type of data object is a sound object shown as sound icon **24** within the hypermedia document. When the user selects sound icon **24**, the user's computer accesses sound data shown symbolically by data file **40**. The accessed sound data plays through a speaker or other audio device.

As discussed above, hypermedia documents allow a user to access different data objects. The objects may be text, images, sound files, video, additional documents, etc. As used in this specification, a data object is information capable of being retrieved and presented to a user of a computer system. Some data objects include executable code combined with data. An example of such a combination is a "self-extracting" data object that includes code to "unpack" or decompress data that has been compressed to make it smaller before transferring. When a browser retrieves an object such as a self-extracting data object the browser may allow the user to "launch" the self-extracting data object to automatically execute the unpacking instructions to expand the data object to its original size. Such a combination of executable code and data is limited in that the user can do no more than invoke the code to perform a singular function such as performing the self-extraction after which time the object is a standard data object.

Other existing approaches to embedding interactive program objects in documents include the Object Linking and Embedding (OLE) facility in Microsoft Windows, by Microsoft Corp., and OpenDoc, by Apple Computer, Inc. At least one shortcoming of these approaches is that neither is capable of allowing a user to access embedded interactive program objects in distributed hypermedia documents over networks.

FIG. **2** is an example of a computer network. In FIG. **2**, computer systems are connected to Internet **100**, although in practice Internet **100** may be replaced by any suitable computer network. In FIG. **2**, a user **102** operates a small computer **104**, such as a personal computer or a work station. The user's computer is equipped with various components, such as user input devices (mouse, trackball, keyboard, etc.), a display device (monitor, liquid crystal display (LCD), etc.), local storage (hard disk drive, etc.), and other components. Typically, small computer **104** is connected to a larger computer, such as server A at **106**. The larger computer may have additional users and computer systems connected to it, such as computer **108** operated by user **110**. Any group of computers may form a localized network. A localized network does not necessarily adopt the uniform protocols of the larger interconnecting network (i.e., Internet **100**) and is more geographically constrained than the larger network. The localized network may connect to the larger network through a "gateway" or "node" implemented on, for example, a server.

Internet **100** connects other localized networks, such as server B at **120**, which interconnects users **122**, **124** and **126** and their respective computer systems to Internet **100**. Internet **100** is made up of many interconnected computer systems and communication links. Communication links may be by hardwire, fiber optic cable, satellite or other radio wave propagation, etc. Data may move from server A to server B through any number of intermediate servers and communication links or other computers and data processing equipment not shown in FIG. **2** but symbolically represented by Internet **100**.

A user at a workstation or personal computer need not connect to the Internet via a larger computer, such as server A or server B. This is shown, for example, by small computer **130** connected directly to Internet **100** as by a telephone modem or other link. Also, a server need not have users connected to it locally, as is shown by server C at **132** of FIG. **2**. Many configurations of large and small computers are possible.

Typically, a computer on the Internet is characterized as either a "client" or "server" depending on the role that the computer is playing with respect to requesting information or providing information. Client computers are computers that typically request information from a server computer which provides the information. For this reason, servers are usually larger and faster machines that have access to many data files, programs, etc., in a large storage associated with the server. However, the role of a server may also be adopted by a smaller machine depending on the transaction. That is, user **110** may request information via their computer **108** from server A. At a later time, server A may make a request for information from computer **108**. In the first case, where computer **108** issues a request for information from server A, computer **108** is a "client" making a request of information from server A. Server A may have the information in a storage device that is local to Server A or server A may have to make requests of other computer systems to obtain the information. User **110** may also request information via their computer **108** from a server, such as server B located at a remote geographical location on the Internet. However, user **110** may also request information from a computer, such as small computer **124**, thus placing small computer **124** in the role of a "server." For purposes of this specification, client and server computers are categorized in terms of their predominant role as either an information requestor or provider. Clients are generally information requestors, while servers are generally information providers.

Referring again to FIG. **1**, data objects such as distributed hypermedia documents **10**, **12** and **14**, image **16** and sound data file **40**, may be located at any of the computers shown in FIG. **2**. Since these data objects may be linked to a document located on another computer the Internet allows for remote object linking.

For example, hypertext document **10** of FIG. **1** may be located at user **110**'s client computer **108**. When user **110** makes a request by, for example, clicking on hypertext **20** (i.e., the phrase "hypermedia"), user **110**'s small client com-

puter **108** processes links within hypertext document **10** to retrieve document **14**. In this example, we assume that document **14** is stored at a remote location on server B. Thus, in this example, computer **108** issues a command that includes the address of document **14**. This command is routed through server A and Internet **100** and eventually is received by server B. Server B processes the command and locates document **14** on its local storage. Server **14** then transfers a copy of the document back to client **108** via Internet **100** and server A. After client computer **108** receives document **14**, it is displayed so that user **110** may view it.

Similarly, image object **16** and sound data file **40** may reside at any of the computers shown in FIG. **2**. Assuming image object **16** resides on server C when user **110** clicks on image icon **22**, client computer **108** generates a command to retrieve image object **16** to server C. Server C receives the command and transfers a copy of image object **16** to client computer **108**. Alternatively, an object, such as sound data file **40**, may reside on server A so that it is not necessary to traverse long distances via the Internet in order to retrieve the data object.

The Internet is said to provide an "open distributed hypermedia system." It is an "open" system since Internet **100** implements a standard protocol that each of the connecting computer systems, **106**, **130**, **120**, **132** and **134** must implement (TCP/IP). It is a "hypermedia" system because it is able to handle hypermedia documents as described above via standards such as the HTTP and HTML hypertext transmission and mark up standards, respectively. Further, it is a "distributed" system because data objects that are imbedded within a document may be located on many of the computer systems connected to the Internet. An example of an open distributed hypermedia system is the so-called "world-wide web" implemented on the Internet and discussed in papers such as the Berners-Lee reference given above.

The open distributed hypermedia system provided by the Internet allows users to easily access and retrieve different data objects located in remote geographic locations on the Internet. However, this open distributed hypermedia system as it currently exists has shortcomings in that today's large data objects are limited largely by bandwidth constraints in the various communication links in the Internet and localized networks, and by the limited processing power, or computing constraints, of small computer systems normally provided to most users. Large data objects are difficult to update at frame rates fast enough (e.g., 30 frames per second) to achieve smooth animation. Moreover, the processing power needed to perform the calculations to animate such images in real time does not exist on most workstations, not to mention personal computers. Today's browsers and viewers are not capable of performing the computation necessary to generate and render new views of these large data objects in real time.

For example, the Internet's open distributed hypermedia system allows users to view still images. These images are simple non-interactive two-dimensional images, similar to photographs. Much digital data available today exists in the form of high-resolution multi-dimensional image data (e.g., three dimensional images) which is viewed on a computer while allowing the user to perform real time viewing transformations on the data in order for the user to better understand the data.

An example of such type of data is in medical imaging where advanced scanning devices, such as Magnetic Resonance Imaging (MRI) and Computed Tomography (CT), are widely used in the fields of medicine, quality assurance and meteorology to present physicians, technicians and meteorologists with large amounts of data in an efficient way. Because visualization of the data is the best way for a user to grasp the data's meaning, a variety of visualization techniques and real time computer graphics methods have been developed. However, these systems are bandwidth-intensive and compute-intensive and often require multiprocessor arrays and other specialized graphics hardware to carry them out in real time. Also, large amounts of secondary storage for data are required. The expense of these requirements has limited the ability of researchers to readily exchange findings since these larger computers required to store, present and manipulate images are not available to many of the researchers that need to have access to the data.

On the other hand, small client computers in the form of personal computers or workstations such as client computer **108** of FIG. **2** are generally available to a much larger number of researchers. Further, it is common for these smaller computers to be connected to the Internet. Thus, it is desirable to have a system that allows the accessing, display and manipulation of large amounts of data, especially image data, over the Internet to a small, and relatively cheap, client computer.

Due to the relatively low bandwidth of the Internet (as compared to today's large data objects) and the relatively small amount of processing power available at client computers, many valuable tasks performed by computers cannot be performed by users at client computers on the Internet. Also, while the present open distributed hypermedia system on the Internet allows users to locate and retrieve data objects it allows users very little, if any, interaction with these data objects. Users are limited to traditional hypertext and hypermedia forms of selecting linked data objects for retrieval and launching viewers or other forms of external software to have the data objects presented in a comprehensible way.

Thus, it is desirable to have a system that allows a user at a small client computer connected to the Internet to locate, retrieve and manipulate data objects when the data objects are bandwidth-intensive and compute-intensive. Further, it is desirable to allow a user to manipulate data objects in an interactive way to provide the user with a better understanding of information presented and to allow the user to accomplish a wider variety of tasks.

BRIEF SUMMARY OF THE INVENTION

The present invention provides a method for running embedded program objects in a computer network environment. The method includes the steps of providing at least one client workstation and one network server coupled to the network environment where the network environment is a distributed hypermedia environment; displaying, on the client workstation, a portion of a hypermedia document received over the network from the server, where the hypermedia document includes an embedded controllable application; and interactively controlling the embedded controllable application from the client workstation via communication sent over the distributed hypermedia environment.

The present invention allows a user at a client computer connected to a network to locate, retrieve and manipulate objects in an interactive way. The invention not only allows the user to use a hypermedia format to locate and retrieve program objects, but also allows the user to interact with an application program located at a remote computer. Interprocess communication between the hypermedia browser and the embedded application program is ongoing after the program object has been launched. The user is able to use a vast amount of computing power beyond that which is contained in the user's client computer.

In one application, high resolution three dimensional images are processed in a distributed manner by several computers located remotely from the user's client computer. This amounts to providing parallel distributed processing for tasks such as volume rendering or three dimensional image transformation and display. Also, the user is able to rotate, scale and otherwise reposition the viewpoint with respect to these images without exiting the hypermedia browser software. The control and interaction of viewing the image may be provided within the same window that the browser is using assuming the environment is a "windowing" environment. The viewing transformation and volume rendering calculations may be performed by remote distributed computer systems.

Once an image representing a new viewpoint is computed the frame image is transmitted over the network to the user's client computer where it is displayed at a designated position within a hypermedia document. By transmitting only enough information to update the image, the need for a high bandwidth data connection is reduced. Compression can be used to further reduce the bandwidth requirements for data transmission.

Other applications of the invention are possible. For example, the user can operate a spreadsheet program that is being executed by one or more other computer systems connected via the network to the user's client computer. Once the spreadsheet program has calculated results, the results may be sent over the network to the user's client computer for display to the user. In this way, computer systems located remotely on the network can be used to provide the computing power that may be required for certain tasks and to reduce the data bandwidth by only transmitting results of the computations.

Still other applications of the present invention are possible, as disclosed in the specification, below.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** illustrates examples of hypertext and hypermedia documents and links;

FIG. **2** is an example of a computer network;

FIG. **3** is an illustration of a computer system suitable for use with the present invention;

FIG. **4** is an illustration of basic subsystems in the computer system of FIG. **3**;

FIG. **5** is an illustration of an embodiment of the invention using a client computer, server computer and a network;

FIG. **6** shows another embodiment of the present invention using additional computers on the network;

FIG. **7**A is a flowchart of some of the functionality within the HTMLparse.c file;

FIG. **7**B is a flowchart of some of the functionality within the HTMLformat.c file;

FIG. **8**A is a flowchart of some of the functionality within the HTMLwidget.c file;

FIG. **8**B is a flowchart of some of the functionality within the HTML.c file;

FIG. **9** is a screen display generated in accordance with the present invention; and

FIG. **10** is a diagram of the various processes and data paths in the present invention.

DETAILED DESCRIPTION OF THE INVENTION

375 pages of Source code on 4 microfiche Appendices A and B are provided to this specification. The source code should be consulted to provide details of a specific embodiment of the invention in conjunction with the discussion of the routines in this specification. The source code in Appendix A includes NCSA Mosaic version 2.4 source code along with modifications to the source code to implement the present invention. Appendix B includes source code implementing an application program interface. The source code is written in the "C" computer language to run on an X-Window platform.

FIG. **3** is an illustration of a computer system suitable for use with the present invention. FIG. **3** depicts but one example of many possible computer types or configurations capable of being used with the present invention. FIG. **3** shows computer system **150** including display device **153**, display screen **155**, cabinet **157**, keyboard **159** and mouse **161**.

Mouse **161** and keyboard **159** are "user input devices." Other examples of user input devices are a touch screen, light pen, track ball, data glove, etc. Mouse **161** may have one or more buttons such as buttons **163** shown in FIG. **3**. Cabinet **157** houses familiar computer components such as disk drives, a processor, storage means, etc. As used in this specification "storage means" includes any storage device used in connection with a computer system such as disk drives, magnetic tape, solid state memory, bubble memory, etc. Cabinet **157** may include additional hardware such as input/output (I/O) interface cards for connecting computer system **150** to external devices such as an optical character reader, external storage devices, other computers or additional devices.

FIG. **4** is an illustration of basic subsystems in computer system **150** of FIG. **3**. In FIG. **4**, subsystems are represented by blocks such as central processor **180**, system memory **181** consisting of random access memory (RAM) and/or read-only memory (ROM), display adapter **182**, monitor **183** (equivalent to display device **153** of FIG. **3**), etc. The subsystems are interconnected via a system bus **184**. Additional subsystems such as a printer, keyboard, fixed disk and others are shown. Peripherals and input/output (I/O) devices can be connected to the computer system by, for example serial port **185**. For example, serial port **185** can be used to connect the computer system to a modem for connection to a network or serial port **185** can be used to interface with a mouse input device. The interconnection via system bus **184** allows central processor **180** to communicate with each subsystem and to control the execution of instructions from system memory **181** or fixed disk **186**, and the exchange of information between subsystems. Other arrangements of subsystems and interconnections are possible.

FIG. **5** is an illustration of an embodiment of the invention using a client computer, server computer and a network.

In FIG. **5**, client computer **200** communicates with server computer **204** via network **206**. Both client computer **200** and server computer **204** use a network protocol layer to communicate with network **206**. In a preferred embodiment, network **206** is the Internet and the network protocol layers are TCP/IP. Other networks and network protocols may be used. For ease of illustration, additional hardware and software layers are not shown in FIG. **5**.

Client computer **200** includes processes, such as browser client **208** and application client **210**. In a preferred embodiment, application client **210** is resident within client computer **200** prior to browser client **208**'s parsing of a hypermedia document as discussed below. In a preferred embodiment application client **210** resides on the hard disk or RAM of client computer **200** and is loaded (if necessary) and executed when browser client **208** detects a link to application client **210**. The preferred embodiment uses the XEvent interprocess communication protocol to exchange information between browser client **208** and application client **210** as described in more detail, below. Another possibility is to install application client **210** as a "terminate and stay resident" (TSR) pro-

gram in an operating system environment, such as X-Window. Thereby making access to application client **210** much faster.

Browser client **208** is a process that a user of client computer **200** invokes in order to access various data objects, such as hypermedia documents, on network **206**. Hypermedia document **212** shown within client computer **200** is an example of a hypermedia document, or object, that a user has requested access to. In this example, hypermedia document **212** has been retrieved from a server connected to network **206** and has been loaded into, e.g., client computer **200**'s RAM or other storage device.

Once hypermedia document **212** has been loaded into client computer **200**, browser client **208** parses hypermedia document **212**. In parsing hypermedia document **212**, browser client **208** detects links to data objects as discussed above in the Background of the Invention section. In FIG. **5**, hypermedia document **212** includes an embedded program link at **214**. Embedded program link **214** identifies application client **212** as an application to invoke. In this present example, the application, namely, application client **210**, resides on the same computer as the browser client **208** that the user is executing to view the hypermedia document. Embedded program link **214** may include additional information, such as parameters, that tell application client **210** how to proceed. For example, embedded program link **214** may include a specification as to a data object that application client **210** is to retrieve and process.

When browser client **208** encounters embedded program link **214**, it invokes application client **210** (optionally, with parameters or other information) and application client **210** executes instructions to perform processing in accordance with the present invention.

An example of the type of processing that application client **210** may perform is multidimensional image visualization. Note that application client **210** is in communication with network **206** via the network protocol layer of client computer **200**. This means that application client **210** can make requests over network **206** for data objects, such as multidimensional image objects. For example, application client **210** may request an object, such as object **1** at **216**, located in server computer **204**. Application client **210** may make the request by any suitable means. Assuming network **206** is the Internet, such a request would typically be made by using HTTP in response to a HTML-style link definition for embedded program link **214**.

Assuming application client **210** has made a request for the data object at **216**, server process **218** ultimately receives the request. Server process **218** then retrieves data object **216** and transfers it over network **206** back to application client **210**. To continue with the example of a multidimensional visualization application, data object **216** may be a three dimensional view of medical data for, e.g., an embryo.

After application client **210** receives the multidimensional data object **216**, application client **210** executes instructions to display the multidimensional embryo data on the display screen to a user of the client computer **200**. The user is then able to interactively operate controls to recompute different views for the image data. In a preferred embodiment, a control window is displayed within, or adjacent to, a window generated by browser client **208** that contains a display of hypermedia document **212**. An example of such display is discussed below in connection with FIG. **9**. Thus, the user is able to interactively manipulate a multidimensional image object by means of the present invention. In order to make application client **210** integral with displays created by browser client **208**, both the browser client and the application client must be in communication with each other, as shown by the arrow connecting the two within client computer **200**. The manner of communication is through an application program interface (API), discussed below.

Browser client **208** is a process, such as NCSA Mosaic, Cello, etc. Application client **210** is embodied in software presently under development called "VIS" and "Panel" created by the Center for Knowledge Management at the University of California, San Francisco, as part of the Doyle Group's distributed hypermedia object embedding approach described in "Integrated Control of Distributed Volume Visualization Through the World-Wide-Web," by C. Ang, D. Martin, M. Doyle; to be published in the Proceedings of Visualization **1994**, IEEE Press, Washington, D.C., October 1994.

Versions and descriptions of software embodying the present invention are generally available as hyperlinked data objects from the Visible Embryo Project's World Wide Web document at the URL address "HTTP://visembryo.ucsf.edu/".

Another embodiment of the present invention uses an application server process executing on server computer **204** to assist in processing that may need to be performed by an external program. For example, in FIG. **5**, application server **220** resides on server computer **204**. Application server **220** works in communication with application client **210** residing on client computer **200**. In a preferred embodiment, application server **220** is called VRServer, also a part of Doyle Group's approach. Since server computer **204** is typically a larger computer having more data processing capabilities and larger storage capacity, application server **220** can operate more efficiently, and much faster, than application client **210** in executing complicated and numerous instructions.

In the present example where a multidimensional image object representing medical data for an embryo is being viewed, application server **220** could perform much of the viewing transformation and volume rendering calculations to allow a user to interactively view the embryo data at their client computer display screen. In a preferred embodiment, application client **210** receives signals from a user input device at the user's client computer **200**. An example of such input would be to rotate the embryo image from a current position to a new position from the user's point of view. This information is received by application client **210** and processed to generate a command sent over network **206** to application server **220**. Once application server **220** receives the information in the form of, e.g., a coordinate transformation for a new viewing position, application server **220** performs the mathematical calculations to compute a new view for the embryo image. Once the new view has been computed, the image data for the new view is sent over network **206** to application client **210** so that application client **210** can update the viewing window currently displaying the embryo image. In a preferred embodiment, application server **220** computes a frame buffer of raster display data, e.g., pixel values, and transfers this frame buffer to application client **210**. Techniques, such as data compression and delta encoding, can be used to compress the data before transmitting over network **206** to reduce the bandwidth requirement.

It will be readily seen that application server **220** can advantageously use server computer **204**'s computing resources to perform the viewing transformation much more quickly than could application client **210** executing on client computer **200**. Further, by only transmitting the updated frame buffer containing a new view for the embryo image, the amount of data sent over network **206** is reduced. By using appropriate compression techniques, such as, e.g., MPEG

(Motion Picture Experts Group) or JPEG (Joint Photographic Experts Group), efficient use of network **206** is preserved.

FIG. **6** shows yet another embodiment of the present invention. FIG. **6** is similar to FIG. **5**, except that additional computers **222** and **224** are illustrated. Each additional computer includes a process labeled "Application (Distributed)." The distributed application performs a portion of the task that an application, such as application server **220** or application client **210**, perform. In the present. example, tasks such as volume rendering may be broken up and easily performed among two or more computers. These computers can be remote from each other on network **206**. Thus, several computers, such as server computer **204** and additional computers **222** and **224** can all work together to perform the task of computing a new viewpoint and frame buffer for the embryo for the new orientation of the embryo image in the present example. The coordination of the distributed processing can be performed at client computer **200** by application client **210**, at server computer **204** by application server **220**, or by any of the distributed applications executing on additional computers, such as **222** and **224**. In a preferred embodiment, distributed processing is coordinated by a program called "VIS" represented by application client **210** in FIG. **6**.

Other applications of the invention are possible. For example, the user can operate a spreadsheet program that is being executed by one or more other computer systems connected via the network to the user's client computer. Once the spreadsheet program has calculated results, those results may be sent over the network to the user's client computer for display within the hypermedia document on the user's client computer. In this way, computer systems located remotely on the network can be used to provide the computing power that may be required for certain tasks and to reduce the data bandwidth required by only transmitting results of the computations.

Another type of possible application of this invention would involve embedding a program which runs only on the client machine, but which provides the user with more functionality than exists in the hypermedia browser alone. An example of this is an embedded client application which is capable of viewing and interacting with images which have been processed with Dr. Doyle's MetaMAP invention (U.S. Pat. No. 4,847,604). This MetaMAP process uses object-oriented color map processing to allow individual color index ranges within paletted images to have object identities, and is useful for the creation of, for example, interactive picture atlases. It is a more efficient means for defining irregular "hotspots" on images than the ISMAP function of the World Wide Web, which uses polygonal outlines to define objects in images. A MetaMAP-capable client-based image browser application can be embedded, together with an associated image, within a hypermedia document, allowing objects within the MetaMAP-processed image to have URL addresses associated with them. When a user clicks with a mouse upon an object within the MetaMAP-processed image, the MetaMAP client application relays the relevant URL back to the hypermedia browser application, which then retrieves the HTML file or hypermedia object which corresponds to that URL.

The various processes in the system of the present invention communicate through a custom API called Mosaic/External Application Program Interface MEAPI. The MEAPI set of predefined messages includes those shown in Table I.

TABLE I

Message Function Message Name
Messages from server to client:
1. Server Update Done XtNrefreshNotify
2. Server Ready XtNpanelStartNotify
3. Server Exiting XtNpanelExitNotify
Messages from client to server:
4. Area Shown XtNmapNotify
5. Area Hidden XtNunmapNotify
6. Area Destroyed XtNexitNotify

The messages in Table I are defined in the file protocol.sub.--lib.h in Appendix B. The functions of the MEAPI are provided in protocol.sub.--lib.c of Appendix B. Thus, by using MEAPI a server process communicates to a client application program to let the client application know when the server has finished updating information, such as an image frame buffer, or pixmap (Message 1); when the server is ready to start processing messages (Message 2) and when the server is exiting or stopping computation related to the server application program.

For client to server communications, MEAPI provides for the client informing the server when the image display window area is visible, when the area is hidden and when the area is destroyed. Such information allows the server to decide whether to allocate computing resources for, e.g., rendering and viewing transformation tasks where the server is running an application program to generate new views of a multi dimensional object. Source code for MEAPI fundamental functions such as handle.sub.--client.sub.--msg, register.sub.--client, register.sub.--client.sub.--msg.sub.--callback and send.sub.--client.sub.--msg may be found in protocol.sub.--lib.c as part of the source code in Appendix B. Next, a discussion of the software processes that perform parsing of a hypermedia document and launching of an application program is provided in connection with Table II and FIGS. **7**A, **7**B, **8**A and **8**B. Table II, below, shows an example of an HTML tag format used by the present invention to embed a link to an application program within a hypermedia document.

For client to server communications, MEAPI provides for the client informing the server when the image display window area is visible, when the area is hidden and when the area is destroyed. Such information allows the server to decide whether to allocate computing resources for, e.g., rendering and viewing transformation tasks where the server is running an application program to generate new views of a multi dimensional object. Source code for MEAPI fundamental functions such as handle.sub.--client.sub.--msg, register.sub.--client, register.sub.--client.sub.--msg.sub.--callback and send.sub.--client.sub.--msg may be found in protocol.sub.--lib.c as part of the source code in Appendix B.

Next, a discussion of the software processes that perform parsing of a hypermedia document and launching of an application program is provided in connection with Table II and FIGS. **7**A, **7**B, **8**A and **8**B.

Table II, below, shows an example of an HTML tag format used by the present invention to embed a link to an application program within a hypermedia document.

TABLE II

& lt EMBED TYPE = "type" HREF = "href"

TABLE II-continued

WIDTH = width HEIGHT = height & gt

As shown in Table II, the EMBED tag includes TYPE, HREF, WIDTH and HEIGHT elements. The TYPE element is a Multipurpose Internet Mail Extensions (MIME) type. Examples of values for the TYPE element are "application/x-vis" or "video/mpeg". The type "application/x-vis" indicates that an application named "x-vis" is to be used to handle the object at the URL specified by the HREF. Other types are possible such as "application/x-inventor", "application/postscript" etc. In the case where TYPE is "application/x-vis" this means that the object at the URL address is a three dimensional image object since the program "x-vis" is a data visualization tool designed to operate on three dimensional image objects. However, any manner of application program may be specified by the TYPE element so that other types of applications, such as a spreadsheet program, database program, word processor, etc. may be used with the present invention. Accordingly, the object reference by the HREF element would be, respectively, a spreadsheet object, database object, word processor document object, etc.

On the other hand, TYPE values such as "video/mpeg", "image/gif", "video/x-sgi-movie", etc. describe the type of data that HREF specifies. This is useful where an external application program, such as a video player, needs to know what format the data is in, or where the browser client needs to determine which application to launch based on the data format. Thus, the TYPE value can specify either an application program or a data type. Other TYPE values are possible. HREF specifies a URL address as discussed above for a data object. Where TYPE is "application/x-vis" the URL address specifies a multi-dimensional image object. Where TYPE is "video/mpeg" the URL address specifies a video object.

WIDTH and HEIGHT elements specify the width and height dimensions, respectively, of a Distributed Hypermedia Object Embedding (DHOE) window to display an external application object such as the three dimensional image object or video object discussed above.

FIG. **7**A is a flowchart describing some of the functionality within the HTMLparse.c file of routines. The routines in HTMLparse.c perform the task of parsing a hypermedia document and detecting the EMBED tag. In a preferred embodiment, the enhancements to include the EMBED tag are made to an HTML library included in public domain NCSA Mosaic version 2.4. Note that much of the source code in is pre-existing NCSA Mosaic code. Only those portions of the source code that relate to the new functionality discussed in this specification should be considered as part of the invention. The new functionality is identifiable as being set off from the main body of source code by conditional compilation macros such as "#ifdef . . . #endif" as will be readily apparent to one of skill in the art.

In general, the flowcharts in this specification illustrate one or more software routines executing in a computer system such as computer system **1** of FIG. **1**. The routines may be implemented by any means as is known in the art. For example, any number of computer programming languages, such as "C", Pascal, FORTRAN, assembly language, etc., may be used. Further, various programming approaches such as procedural, object oriented or artificial intelligence techniques may be employed.

The steps of the flowcharts may be implemented by one or more software routines, processes, subroutines, modules, etc. It will be apparent that each flowchart is illustrative of merely the broad logical flow of the method of the present invention and that steps may be added to, or taken away from, the flowcharts without departing from the scope of the invention. Further, the order of execution of steps in the flowcharts may be changed without departing from the scope of the invention. Additional considerations in implementing the method described by the flowchart in software may dictate changes in the selection and order of steps. Some considerations are event handling by interrupt driven, polled, or other schemes. A multiprocessing or multitasking environment could allow steps to be executed "concurrently." For ease of discussion the implementation of each flowchart may be referred to as if implemented in a single "routine".

The modifications to NCSA Mosaic version 2.4 software files HTMLparse.c, HTMLformat.c, HTMLwidget.c and HTML.c will next be discussed, in turn.

Returning to FIG. **7**, it is assumed that a hypermedia document has been obtained at a user's client computer and that a browser program executing on the client computer displays the document and calls a first routine in the HTMLparse.c file called "HTMLparse". This first routine, HTMLparse, is entered at step **252** where a pointer to the start of the document portion is passed. Steps **254**, **256** and **258** represent a loop where the document is parsed or scanned for HTML tags or other symbols. While the file HTMLparse.c includes routines to handle all possible tags and symbols that may be encountered, FIG. **7**A, for simplicity, only illustrates the handling of EMBED tags.

Assuming there is more text to parse, execution proceeds to step **256** where routines in HTMLparse.c obtain the next item (e.g., word, tag or symbol) from the document. At step **258** a check is made as to whether the current tag is the EMBED tag. If not, execution returns to step **254** where the next tag in the document is obtained. If, at step **258**, it is determined that the tag is the EMBED tag, execution proceeds to step **260** where an enumerated type is assigned for the tag. Each occurrence of a valid EMBED tag specifies an embedded object. HTMLParse calls a routine "get.sub.--mark" in HTMLparse.c to put sections of HTML document text into a "markup" text data structure. Routine get.sub.--mark, in turn, calls ParseMarkType to assign an enumerated type. The enumerated type is an identifier with a unique integer associated with it that is used in later processing described below.

Once all of the hypermedia text in the text portion to be displayed has been parsed, execution of HTMLparse.c routines terminates at step **262**.

FIG. **7**B is a flowchart of routines in file HTMLformat.c to process the enumerated type created for the EMBED tag by routines in HTMLparse.c. In the X-Window implementation of a preferred embodiment, the enumerated type is processed as if it is a regular Motif/XT widget. For details on X-Window development see, e.g., "Xlib Programming Manual," "X Toolkit Intrinsics Programming Manual" and "Motif Programming Manual" published by O'Reilly & Associates, Inc. HTMLformat is entered at step **270** where a pointer to the enumerated type to process is passed.

At step **272** the parameters of the structure are initialized in preparation for inserting a DrawingArea widget on an HTML page. This includes providing values for the width and height of a window on the display to contain an image, position of the window, style, URL of the image object, etc. Various codes are also added by routines in HTMLformat.c (such as TriggerMarkChanges) to insert an internal representation of the HTML statement into an object list maintained internally

by the browser. In the X-Window application corresponding to the source code of Appendix A, the browser is NCSA Mosaic version 2.4.

FIG. **8**A is a flowchart for routine HTMLwidget. HTMLwidget creates display data structures and launches an external application program to handle the data object specified by the URL in the EMBED tag.

HTMLwidget is entered at step **280** after HTMLformat has created the internal object representation of the EMBED tag. HTMLwidget is passed the internal object and performs its processing on the object. At step **282** the DrawingArea widget is created according to the type of the internal representation, from HTMLformat, specified in the internal object. Similarly, at step **284** a pixmap area for backing storage is defined.

At step **286** a check is made as to whether the type attribute of the object, i.e., the value for the TYPE element of the EMBED tag, is an application. If so, step **290** is executed to launch a predetermined application. In a preferred embodiment an application is launched according to a user-defined list of application type/application pairs. The list is defined as a user-configurable XResource as described in "Xlib Programming Manual." An alternative embodiment could use the MIME database as the source of the list of application type/application pairs. The routine "vis.sub.--start.sub.--external.sub.--application" in file HTMLformat.c is invoked to match the application type and to identify the application to launch.

The external application is started as a child process of the current running process (Mosaic), and informed about the window ID of the DrawingArea created in HTMLformat. The external application is also passed information about the ID of the pixmap, the data URL and dimensions. Codes for communication such as popping-up/iconifying, start notification, quit notification and refresh notification with external applications and DrawingArea refreshing are also added. Examples of such codes are (1) "setup/start" in vis.sub.--register.sub.--client and vis.sub.--get panel.sub.--window in HTMLwidgets.c; (2) "handle messages from external applications" in vis.sub.--handle panel.sub.--msg in HTMLwidgets.c; (3) "send messages to external applications" in vis.sub.--send.sub.--msg in HTMLwidgets.c; (4) "terminate external applications" in vis.sub.--exit in HTMLwidgets.c which calls vis.sub.--send.sub.--msg to send a quit message; and (5) "respond to refresh msgs" in vis.sub.--redraw in HTMLwidgets.c.

If, at step **286**, the type is determined not to be an application object (e.g., a three dimensional image object in the case of application "x-vis") a check is made at step **288** to determine if the type is a video object. If so, step **292** is executed to launch a video player application. Parameters are passed to the video player application to allow the player to display the video object within the DrawingArea within the display of the portion of hypermedia document on the client's computer. Note that many other application objects types are possible as described above.

FIG. **8**B is a flowchart for routine HTML. Routine HTML takes care of "shutting down" the objects, data areas, etc. that were set up to launch the external application and display the data object. HTML is entered at step **300** and is called when the display or other processing of the EMBED tag has been completed. At step **302** the display window is removed and the memory areas for the pixmap and internal object structure is made free for other uses. Completion of processing can be by user command or by computer control.

The present invention allows a user to have interactive control over application objects such as three dimensional image objects and video objects. In a preferred embodiment, controls are provided on the external applications' user interface. In the case of a VIS/panel application, a process, "panel" creates a graphical user interface (GUI) thru which the user interacts with the data. The application program, VIS, can be executing locally with the user's computer or remotely on a server, or on one or more different computers, on the network. The application program updates pixmap data and transfers the pixmap data (frame image data) to a buffer to which the browser has access. The browser only needs to respond to the refresh request to copy the contents from the updated pixmap to the DrawingArea. The Panel process sends messages as "Msg" sending performed by routines such as vis.sub.--send.sub.--msg and vis.sub.--handle panel.sub.--msg to send events (mousemove, keypress, etc.) to the external application.

FIG. **9** is a screen display of the invention showing an interactive application object (in this case a three dimensional image object) in a window within a browser window. In FIG. **9**, the browser is NCSA Mosaic version 2.4. The processes VIS, Panel and VRServer work as discussed above. FIG. **9** shows screen display **356** Mosaic window **350** containing image window **352** and a portion of a panel window **354**. Note that image window **352** is within Mosaic window **350** while panel window **354** is external to Mosaic window **350**. Another possibility is to have panel window **354** within Mosaic window **350**. By using the controls in panel window **354** the user is able to manipulate the image within image window **352** in real time do perform such operations as scaling, rotation, translation, color map selection, etc. In FIG. **9**, two Mosaic windows are being used to show two different views of an embryo image. One of the views is rotated by six degrees from the other view so that a stereoscopic effect can be achieved when viewing the images. Communication between Panel and VIS is via "Tooltalk" described in, e.g., "Tooltalk 1.1.1 Reference Manual," from SunSoft.

FIG. **10** is an illustration of the processes VIS, Panel and VRServer discussed above. As shown in FIG. **10**, the browser process, Mosaic, communicates with the Panel process via inter-client communication mechanisms such as provided in the X-Window environment. The Panel process communicates with the VIS process through a communications protocol (ToolTalk, in the preferred embodiment) to exchange visualization command messages and image data. The image data is computed by one or more copies of a process called VRServer that may be executing on remote computers on the network. VRServer processes respond to requests such as rendering requests to generate image segments. The image segments are sent to VIS and combined into a pixmap, or frame image, by VIS. The frame image is then transferred to the Mosaic screen via communications between VIS, Panel and Mosaic. A further description of the data transfer may be found in the paper "Integrated Control of Distributed Volume Visualization Through the World-Wide-Web," referenced above.

In the foregoing specification, the invention has been described with reference to a specific exemplary embodiment thereof. It will, however, be evident that various modifications and changes may be made thereunto without departing from the broader spirit and scope of the invention as set forth in the appended claims. For example, various programming languages and techniques can be used to implement the disclosed invention. Also, the specific logic presented to accomplish tasks within the present invention may be modified without departing from the scope of the invention. Many such changes or modifications will be readily apparent to one of ordinary skill in the art. The specification and drawings are,

accordingly, to be regarded in an illustrative rather than a restrictive sense, the invention being limited only by the provided claims.

What is claimed is:

1. A server computer for use in the World Wide Web distributed hypermedia network on the Internet, and for disseminating interactive content to two or more client computers via the World Wide Web distributed hypermedia network on the Internet, the server computer comprising:

a processor; and

a memory device which stores a plurality of instructions, which when executed by the processor, enables the processor to:

a. receive a request for information; and

b. cause a transfer of the information onto the World Wide Web distributed hypermedia network on the Internet, wherein:

(i) at least part of the information is configured to enable a World Wide Web browser on each of the client computers to cause a display of a World Wide Web page,

(ii) the World Wide Web browser has been configured to:

(a) parse an HTML tag to detect a data type of an object to cause the World Wide Web browser to employ a data structure to select one of a plurality of different interactive-content applications, the HTML tag specifying a location of at least a portion of the object, the object including the interactive content,

(b) identify the selected interactive-content application,

(c) locate the identified interactive-content application, and

(d) automatically invoke at least a part of the located interactive-content application,

(iii) the automatically invoked interactive-content application has been configured to operate as part of a distributed application configured to enable a user to interact with the object, displayed within the World Wide Web page, through the use of communications sent to and received from at least a portion of the distributed application located on two or more distributed application computers connected to the World Wide Web distributed hypermedia network on the Internet, the two or more distributed application computers being remote from the two or more client computers,

(iv) the data structure has been configured to contain associations between a plurality of data types and corresponding different interactive-content applications for handling objects of the data types, and

(v) the data structure has been configured to be accessible by the World Wide Web browser prior to the World Wide Web browser receiving the information.

2. The server computer of claim **1**, wherein at least one or more coordination computers performs coordination of at least part of the distributed application to perform at least one task.

3. The server computer of claim **2**, wherein the coordination performed is by coordinating, by the one or more coordination computers, communications sent to and received from at least a portion of the distributed application located on two or more separate computers connected to the World Wide Web distributed hypermedia network to enable the separate computers to work together to perform the at least one task.

4. The server computer of claim **3**, wherein the coordination performed comprises generating and sending by the one or more coordination computers commands over a network to coordinate activity of the separate computers working together to perform viewing transformations to enable the interaction with the object.

5. A method, performed by a server computer connected to the World Wide Web distributed hypermedia network on the Internet, for disseminating interactive content to two or more client computers via the World Wide Web distributed hypermedia network on the Internet, the method comprising:

a. receiving, by the server computer, a request for information; and

b. transferring, by the server computer, the information onto the World Wide Web distributed hypermedia network on the Internet, wherein:

(i) at least part of the information is configured to enable a World Wide Web browser on each of the client computers to cause a display of a World Wide Web page,

(ii) the World Wide Web browser has been configured to:

(a) parse an HTML tag to detect a data type of an object to cause the World Wide Web browser to employ a data structure to select one of a plurality of different interactive-content applications, the HTML tag specifying a location of at least a portion of the object, the object including the interactive content,

(b) identify the selected interactive-content application,

(c) locate the identified interactive-content application, and

(d) automatically invoke at least a part of the located interactive-content application,

(iii) the automatically invoked interactive-content application has been configured to operate as part of a distributed application configured to enable a user to interact with the object, displayed within the World Wide Web page, through the use of communications sent to and received from at least a portion of the distributed application located on two or more distributed application computers connected to the World Wide Web distributed hypermedia network on the Internet, the two or more distributed application computers being remote from the two or more client computers,

(iv) the data structure has been configured to contain associations between a plurality of data types and corresponding different interactive-content applications for handling objects of the data types, and

(v) the data structure has been configured to be accessible by the World Wide Web browser prior to the World Wide Web browser receiving the information.

6. The method of claim **5**, wherein at least one or more coordination computers performs coordination of at least part of the distributed application to perform at least one task.

7. The method of claim **1**, wherein the coordination performed is by coordinating by the one or more coordination computers communications sent to and received from at least a portion of the distributed application located on two or more separate computers connected to the World Wide Web distributed hypermedia network to enable the separate computers to work together to perform the at least one task.

8. The method of claim **7**, wherein the coordination performed comprises generating and sending by the one or more coordination computers commands over a network to coor-

dinate activity of the separate computers working together to perform viewing transformations to enable the interaction with the object.

9. A method performed by one or more computers for coordinating distributed processing to enable dissemination of interactive content to two or more client computers, the method comprising:

for each of the client computers:

a. coordinating by the one or more computers processing of at least part of a distributed application to perform at least one task,

b. coordinating by the one or more computers communications sent to and received from at least a portion of the distributed application located on two or more separate computers connected to the World Wide Web distributed hypermedia network to enable the separate computers to work together to perform the at least one task, wherein at least part of the distributed application has been implemented to be part of a distributed interactive-content application configured to enable a user to interact with an object, displayed within a World Wide Web page by the client computer, and

c. generating and sending by the one or more computers commands over a network to coordinate activity of the separate computers working together to perform viewing transformations to enable the interaction with the object, wherein:

(i) the two or more separate computers are remote from the client computer containing a World Wide Web browser configured to cause the display of the World Wide Web page,

(ii) the World Wide Web browser has been enabled by information that has been transferred onto the World Wide Web distributed hypermedia network to display said world Wide Web Page, wherein said World Wide Web browser has been configured to: (a) parse an HTML tag to detect a data type of the object to cause the World Wide Web browser to employ a data structure to select one of a plurality of different interactive-content applications, (b) identify the selected interactive-content application, (c) locate the identified interactive-content application, and (d) automatically invoke the located interactive-content application,

(iii) the automatically invoked interactive-content application has been configured to operate as part of the distributed interactive-content application,

(iv) the data structure has been configured to contain associations between a plurality of data types and corresponding different interactive-content applications for handling of the data types, and

(v) the data structure has been configured to be accessible by the World Wide Web browser prior to the World Wide Web browser receiving the information.

10. A World Wide Web browser for use in the World Wide Web distributed hypermedia network on the Internet, and for accessing interactive content which has been disseminated via the World Wide Web distributed hypermedia network on the Internet, the World Wide Web browser comprising:

software code executable by a client computer, having a display device, to enable the client computer to:

receive information via the World Wide Web distributed hypermedia network on the Internet, wherein at least part of the information has been configured to enable the software code, when executed by the client computer, to cause the display device to display a World Wide Web page, and

wherein the software code is configured to be executed by the client computer to:

(i) parse an HTML tag to detect a data type of an object to employ a data structure to select one of a plurality of different interactive-content applications, the HTML tag specifying a location of at least a portion of the object, the object including the interactive content,

(ii) identify the selected interactive-content application,

(iii) locate the identified interactive-content application, and

(iv) automatically invoke at least a part of the located interactive-content application, wherein:

(a) the automatically invoked interactive-content application is configured to operate as part of a distributed application configured to enable a user to interact with the object, displayed within the World Wide Web page, through the use of communications to be sent to and received from at least a portion of the distributed application located on two or more distributed application computers coupled to the World Wide Web distributed hypermedia network on the Internet and remote from the client computer,

(b) the data structure contains associations between a plurality of data types and corresponding different interactive-content applications for handling objects of the data types, and

(c) the data structure is accessible by the client computer prior to the client computer receiving the information.

11. The World Wide Web browser of claim **10**, wherein at least one or more coordination computers performs coordination of at least part of the distributed application to perform at least one task.

12. The World Wide Web browser of claim **10**, wherein the coordination performed is by coordinating by the one or more coordination computers communications sent to and received from at least a portion of the distributed application located on two or more separate computers connected to the World Wide Web distributed hypermedia network to enable the separate computers to work together to perform the at least one task.

13. The World Wide Web browser of claim **11**, wherein the coordination performed comprises generating and sending by the one or more coordination computers commands over a network to coordinate activity of the separate computers working together to perform viewing transformations to enable the interaction with the object.

14. A client computer for use in the World Wide Web distributed hypermedia network on the Internet and for accessing interactive content which has been disseminated via the World Wide Web distributed hypermedia network on the Internet, the client computer comprising:

a. a display device;

b. an input device;

c. a processor; and

d. a memory device which stores a World Wide Web browser, which when executed by the processor, causes the processor to operate with the display device to:

receive information via the World Wide Web distributed hypermedia network on the Internet, wherein at least part of the information has been configured to enable

the World Wide Web browser, when executed by the processor, to cause the display device to display a World Wide Web page,

wherein, when executed by the processor, the World Wide Web browser is configured to:

(i) parse an HTML tag to detect a data type of an object to cause the World Wide Web browser to employ a data structure to select one of a plurality of different interactive-content applications, the HTML tag specifying a location of at least a portion of the object, the object including the interactive content,

(ii) identify the selected interactive-content application,

(iii) locate the identified interactive-content application, and

(iv) automatically invoke at least a part of the located interactive-content application, wherein:

(a) the automatically invoked interactive-content application has been configured to operate as part of a distributed application configured to enable a user to interact with the object, displayed within the World Wide Web page, through the use of communications to be sent to and received from at least a portion of the distributed application located on two or more distributed application computers coupled to the World Wide Web distributed hypermedia network on the Internet and remote from the client computer,

(b) the data structure contains associations between a plurality of data types and corresponding different interactive-content applications for handling objects of the data types, and

(c) the data structure is accessible by the World Wide Web browser prior to the World Wide Web browser receiving the information.

15. The client computer of claim **14**, wherein the input device includes a touch screen.

16. The client computer of claim **15**, wherein at least one or more coordination computers performs coordination of at least part of the distributed application to perform at least one task.

17. The client computer of claim **15**, wherein the coordination performed is by coordinating by the one or more coordination computers communications sent to and received from at least a portion of the distributed application located on two or more separate computers connected to the World Wide Web distributed hypermedia network to enable the separate computers to work together to perform the at least one task.

18. The client computer of claim **17**, wherein the coordination performed comprises generating and sending by the one or more coordination computers commands over a network to coordinate activity of the separate computers working together to perform viewing transformations to enable the interaction with the object.

19. A server computer for use in the World Wide Web distributed hypermedia network on the Internet, and for disseminating interactive content via the World Wide Web distributed hypermedia network on the Internet, the server computer comprising:

a processor; and

a memory device which stores a plurality of instructions, which when executed by the processor, enables the server to:

a. receive a request for information; and

b. cause a transfer of the information onto the World Wide Web distributed hypermedia network on the Internet, wherein:

(i) a World Wide Web browser on a client computer connected to the World Wide Web distributed hypermedia network has been configured with a plurality of different interactive-content applications, each said interactive-content application being configured to enable a user to interact, within one or more World Wide Web pages, with at least part of one or more objects while at least part of each of one or more objects is displayed to the user within at least one of said one or more World Wide Web pages, and

(ii) at least part of the information is configured to allow the World Wide Web browser on the client computer to:

a. detect at least part of an object to be displayed in a World Wide Web page, and

b. cause a display of the World Wide Web page to a user,

(iii) the World Wide Web browser has been configured to:

a. select an interactive-content application, based upon the information, from among the different interactive-content applications, and

b. automatically invoke the selected interactive-content application to enable the user to employ the selected interactive-content application to interact within the World Wide Web page with at least part of the object while at least part of the object is displayed to the user within the World Wide Web page, wherein the automatically invoked interactive-content application has been configured to operate as part of a distributed application configured to enable a user to perform the interaction through the use of communications sent to and received from at least a portion of the distributed application located on two or more distributed application computers connected to the World Wide Web distributed hypermedia network on the Internet, the two or more distributed application computers being remote from the client computer.

20. The server computer of claim **19**, wherein the browser has been further configured to parse at least one HTML tag in the information, wherein at least a portion of the object is external to the information, and wherein the selecting is based upon a data type of the object.

21. The server computer of claim **20**, wherein at least one or more coordination computers performs coordination of at least part of the distributed application to perform at least one task.

22. The server computer of claim **21**, wherein the coordination performed is by coordinating by the one or more coordination computers communications sent to and received from at least a portion of the distributed application located on two or more separate computers connected to the World Wide Web distributed hypermedia network to enable the separate computers to work together to perform the at least one task.

23. The server computer of claim **22**, wherein the coordination performed comprises generating and sending by the one or more coordination computers commands over a network to coordinate activity of the separate computers working together to perform viewing transformations to enable the interaction with the object.

24. The server computer of claim **19**, wherein at least one or more coordination computers performs coordination of at least part of the distributed application to perform at least one task.

25. The server computer of claim **24**, wherein: the at least one task is broken up and performed among two or more of the distributed application computers.

26. The server computer of claim 25, wherein: the two or more of the distributed application computers work together to perform the at least one task.

27. The server computer of claim 26, wherein: the distributed application computers transmit the results of the computations onto the World Wide Web distributed hypermedia network for display in the hypermedia document.

28. The server computer of claim 27, wherein: the at least one task is to enable a user to perform interaction with at least part of a word processor application while being displayed within the one or more World Wide Web pages.

29. The server computer of claim 27, wherein: the at least one task is to enable a user to perform interaction with at least part of a database application while being displayed within the one or more World Wide Web pages.

30. The server computer of claim 27, wherein: the at least one task is to enable a user to perform interaction with at least part of a spreadsheet application while being displayed within the one or more World Wide Web pages.

31. The server computer of claim 27, wherein: the at least one task is to enable a user to perform interaction with at least part of an application to view a series of delta encoded and compressed video images while being displayed within the one or more World Wide Web pages.

32. A method, performed by a server computer connected to the World Wide Web distributed hypermedia network on the Internet, for disseminating interactive content via the World Wide Web distributed hypermedia network on the Internet, the method comprising:

A. receiving, by the server computer, a request for information; and

B. transferring, by the server computer, the information onto the World Wide Web distributed hypermedia network on the Internet, wherein:

(i) a World Wide Web browser on a client computer connected to the World Wide Web distributed hypermedia network has been configured with a plurality of different interactive-content applications, each said interactive-content application being configured to enable a user to interact, within one or more World Wide Web pages, with at least part of one or more objects while at least part of each of said one or more objects is displayed to the user within at least one of said one or more World Wide Web pages, and

(ii) at least part of the information is configured to allow the World Wide Web browser on the client computer to:

a. detect at least part of an object to be displayed in a World Wide Web page, and

b. cause a display of the World Wide Web page to a user,

(iii) the World Wide Web browser has been configured to:

a. select an interactive-content application, based upon the information, from among the different interactive-content applications, and

b. automatically invoke the selected interactive-content application to enable the user to employ the selected interactive-content application to interact within the World Wide Web page with at least part of the object while at least part of the object is displayed to the user within the World Wide Web page, wherein the automatically invoked interactive-content application has been configured to operate as part of a distributed application configured to enable a user to perform the interaction through the use of communications sent to and received from at least a portion of the distributed application located on two or more distributed application computers connected to the World Wide Web distributed hypermedia network on the Internet, the two or more distributed application computers being remote from the client computer.

33. The method of claim 32, wherein the browser has been further configured to parse at least one HTML tag in the information, wherein at least a portion of the object is external to the information, and wherein the selecting is based upon a data type of the object.

34. The method of claim 33, wherein at least one or more coordination computers performs coordination of at least part of the distributed application to perform at least one task.

35. The method of claim 34, wherein the coordination performed is by coordinating by the one or more coordination computers communications sent to and received from at least a portion of the distributed application located on two or more separate computers connected to the World Wide Web distributed hypermedia network to enable the separate computers to work together to perform the at least one task.

36. The method of claim 35, wherein the coordination performed comprises generating and sending by the one or more coordination computers commands over a network to coordinate activity of the separate computers working together to perform viewing transformations to enable the interaction with the object.

37. The method of claim 32, wherein at least one or more coordination computers performs coordination of at least part of the distributed application to perform at least one task.

38. The method of claim 37, wherein: the at least one task is broken up and performed among two or more of the distributed application computers.

39. The method of claim 38, wherein: the two or more of the distributed application computers work together to perform the at least one task.

40. The method of claim 39, wherein: the distributed application computers transmit the results of the computations onto the World Wide Web distributed hypermedia network for display in the hypermedia document.

41. The method of claim 40, wherein: the at least one task is to enable a user to perform interaction with at least part of a word processor application while being displayed within the one or more World Wide Web pages.

42. The method of claim 40, wherein: the at least one task is to enable a user to perform interaction with at least part of a database application while being displayed within the one or more World Wide Web pages.

43. The method of claim 40, wherein

the at least one task is to enable a user to perform interaction with at least part of a spreadsheet application while being displayed within the one or more World Wide Web pages.

44. The method of claim 40, wherein

the at least one task is to enable a user to perform interaction with at least part of an application to view a series of delta encoded and compressed video images while being displayed within the one or more World Wide Web pages.

45. A method performed by one or more computers for coordinating distributed processing to enable dissemination of interactive content to a client computer, the method comprising:

a. coordinating by the one or more computers processing of at least part of a distributed application to perform at least one task,

b. coordinating by the one or more computers communications sent to and received from at least a portion of the distributed application located on two or more separate computers connected to the World Wide Web distributed hypermedia network to enable the separate computers to

work together to perform the at least one task, wherein at least part of the distributed application has been implemented to be part of a distributed interactive-content application configured to enable a user to interact with at least part of an object, displayed within a World Wide Web page by the client computer, and

c. generating and sending by the one or more computers commands over a network to coordinate activity of the separate computers working together to perform viewing transformations to enable the interaction with at least part of the object, wherein:

a. the two or more separate computers are remote from the client computer containing a World Wide Web browser configured to cause the display of the World Wide Web page,

b. the World Wide Web browser has been configured with a plurality of different interactive-content applications, each said interactive-content application being configured to enable a user to interact, within one or more World Wide Web pages, with at least part of one or more objects while at least part of each of said one or more objects is displayed to the user within at least one of said one or more World Wide Web pages,

c. the World Wide Web browser has been enabled, by information that has been transferred onto the World Wide Web distributed hypermedia network, to detect at least part of the object and to display the world Wide Web Page,

d. the World Wide Web browser has been configured to select an interactive-content application, based upon the information, from among the different interactive-content applications, and automatically invoke the selected interactive-content application,

e. the automatically invoked interactive-content application has been configured to operate as part of the distributed interactive-content application.

46. The method of claim **45**, wherein the browser has been further configured to parse at least one HTML tag in the information, wherein at least a portion of the object is external to the information, and wherein the selecting is based upon a data type of the object.

47. A computer program product for use in a client computer having a display device and coupled to a World Wide Web distributed hypermedia network on the Internet, and for accessing interactive content which has been disseminated via the World Wide Web distributed hypermedia network on the Internet, the computer program product comprising:

one or more non-transitory computer usable media having computer readable program code physically embodied therein, said computer program product further comprising:

computer readable World Wide Web browser program code executable by the client computer to enable the client computer to:

receive information via the World Wide Web distributed hypermedia network on the Internet, wherein at least part of the information has been configured to enable the software code, when executed by the client computer, to:

a. detect at least part of an object to be displayed in a World Wide Web page, and

b. cause a display of the World Wide Web page to a user,

wherein the software code is configured with a plurality of different interactive-content applications, each said interactive-content application being configured to enable a user to interact, within one or more World Wide Web pages, with at least part of one or more objects while at least part of each of said one or more objects is displayed to the user within at least one of said one or more World Wide Web pages, and

wherein the computer readable World Wide Web browser program code enables the client computer to:

a. select an interactive-content application, based upon the information, from among the different interactive-content applications, and

b. automatically invoke the selected interactive-content application to enable the user to employ the selected interactive-content application to interact within the World Wide Web page with at least part of the object while at least part of the object is displayed to the user within the World Wide Web page, wherein the automatically invoked interactive-content application is configured to operate as part of a distributed application configured to enable a user to perform the interaction through the use of communications sent to and received from at least a portion of the distributed application located on two or more distributed application computers connected to the World Wide Web distributed hypermedia network on the Internet, the two or more distributed application computers being remote from the client computer.

48. The computer program product of claim **47**, wherein the computer readable World Wide Web browser program code further enables the client computer to parse at least one HTML tag in the information, wherein at least a portion of the object is external to the information, and wherein the selecting is based upon a data type of the object.

49. The World Wide Web browser of claim **48**, wherein at least one or more coordination computers performs coordination of at least part of the distributed application to perform at least one task.

50. The World Wide Web browser of claim **49**, wherein the coordination performed is by coordinating by the one or more coordination computers communications sent to and received from at least a portion of the distributed application located on two or more separate computers connected to the World Wide Web distributed hypermedia network to enable the separate computers to work together to perform the at least one task.

51. The World Wide Web browser of claim **50**, wherein the coordination performed comprises generating and sending by the one or more coordination computers commands over a network to coordinate activity of the separate computers working together to perform viewing transformations to enable the interaction with the object.

52. A client computer for use in the World Wide Web distributed hypermedia network on the Internet and for accessing interactive content which has been disseminated via the World Wide Web distributed hypermedia network on the Internet, the client computer comprising:

a. a display device;

b. an input device;

c. a processor; and

d. a memory device which stores a World Wide Web browser, which when executed by the processor, causes the processor to operate with the display device to:

receive information from the World Wide Web distributed hypermedia network on the Internet, wherein at least part of the information has been configured to enable the World Wide Web browser, when executed by the processor, to:

a. detect at least part of an object to be displayed in a World Wide Web page, and

b. cause a display of the World Wide Web page to a user,

wherein, when executed by the processor, the browser is configured with a plurality of different interactive-content applications, each said interactive-content application being configured to enable a user to interact, within one or more World Wide Web pages, with at least part of one or more objects while at least part of each of said one or more objects is displayed to the user within at least one of said one or more World Wide Web pages, and wherein, when executed by the processor, the World Wide Web browser has been configured to:

a. select an interactive-content application, based upon the information, from among the different interactive-content applications, and

b. automatically invoke the selected interactive-content application to enable the user to employ the selected interactive-content application to interact within the World Wide Web page with at least part of the object while at least part of the object is displayed to the user within the World Wide Web page, wherein the automatically invoked interactive-content application is configured, when executed by the processor, to operate as part of a distributed application configured to enable a user to perform the interaction through the use of communications sent to and received from at least a portion of the distributed application located on two or more distributed application computers connected to the World Wide Web distributed hypermedia network on the Internet, the two or more distributed application computers being remote from the client computer.

53. The client computer of claim **52**, wherein the browser is further configured, when executed by the processor, to parse at least one HTML tag in the information, wherein at least a portion of the object is external to the information, and wherein the selecting is based upon a data type of the object, and wherein the input device includes a touch screen.

54. The client computer of claim **53**, wherein at least one or more coordination computers performs coordination of at least part of the distributed application to perform at least one task.

55. The client computer of claim **52**, wherein the coordination performed is by coordinating by the one or more coordination computers communications sent to and received from at least a portion of the distributed application located on two or more separate computers connected to the World Wide Web distributed hypermedia network to enable the separate computers to work together to perform the at least one task.

56. The client computer of claim **53**, wherein the coordination performed comprises generating and sending by the one or more coordination computers commands over a network to coordinate activity of the separate computers working together to perform viewing transformations to enable the interaction with the object.

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CERTIFICATE OF COMPLIANCE

I certify that the foregoing Appellant's Brief:

1. Complies with the type-volume limitation of Fed. Cir. R. 32(b)(1). This brief contains 13,712 words, excluding the parts of the brief exempted by Fed. R. App. P. 32(f) and Fed. Cir. R. 32(b)(2). Microsoft Word was used to calculate the word count.

2. Complies with the typeface requirements of Fed. R. App. P. 32(a)(5) and the type style requirements of Fed. R. App. P. 32(a)(6). This brief has been prepared in a proportionally-spaced typeface using Microsoft Word in 14-point Times New Roman type style.

Dated: September 22, 2022

/s/ Joel L. Thollander
Joel L. Thollander